

3/27/22

Strand 2: Science Learning: Contexts, Characteristics and Interactions

SC-organized paper set-Middle School & NGSS Science Teaching & Learning

3:00 PM-4:30 PM

Presider: Clarissa Keen, University of Massachusetts Boston

A Longitudinal Study of Middle School Students' Science Task Values

Sufen Chen, Graduate Institute of Digital Learning and Education & Teacher Education Center,
National Taiwan University of Science and Technology, Taiwan

Ssu-Ching Huang, Graduate Institute of Digital Learning and Education, National Taiwan
University of Science and Technology, Taiwan

Pey-Yan Liou, Department of Education, Korea University, Korea

*An Exploratory Study to Develop a Framework of Middle School Science Giftedness in NGSS
Era*

Shari E. Hiltbrand, Texas Tech University

Mihwa Park, Texas Tech University

*Examining Middle School Teacher Implementation and Enactment of the NGSS: A Mixed
Methods Study*

Erik Arevalo, University of California, Santa Barbara

Meghan Macias, University of California, Santa Barbara

Katy Nilsen, WestEd

Ashley Iveland, WestEd

Examining NGSS Scientific Practices in K-12 Science Classrooms (Virtual)

Peter Hu, University of Pittsburgh

Ling L. Liang, La Salle University

Ying-Chih Chen, Arizona State University

Takeshi Terada,

3/27/22

Strand 2: Science Learning: Contexts, Characteristics and Interactions

*Admin Symposium-A community of practice contextualized within sociocultural phenomena:
Mitigating teaching and learning of STEM through counter-praxis*

3:00 PM-4:30 PM

*A community of practice contextualized within sociocultural phenomena: Mitigating teaching
and learning of STEM through counter-praxis*

Angela M Chapman, University Of Texas Rio Grande Valley

Ariana Garza Garcia

Felicia Rodriguez,

Anthony Bailey,

Juan B. Lazo,

Alejandro J. Gallard, Georgia Southern University

3/27/22

Strand 3: Science Teaching — Primary School (Grades preK-6): Characteristics and Strategies

SC-organized paper set-Diverse Opportunities for Early Science and Engineering Experiences

3:00 PM-4:30 PM

Presider: Ornit Spektor-Levy, Bar-Ilan University

A Mixed Methods Study of Serious Game Design Heuristics that Support Elementary Science Learners

Georgia W Hodges, University of Georgia

Kayla P Flanagan, University of Georgia

Stephanie Eldridge, University of Georgia

Joanna Schneider , University of Georgia

Allan Cohen, University of Georgia

Juyeon Leet ,

Temperature Measurement with Early Elementary Students

Ryan Cain, Weber State University

Victor R Lee, Stanford University

Inspiring Learning Environments—What Preschoolers' Prefer? Do Enriched Environments Enhance Engineering Capabilities? Does Gender Matter?

Ornit Spektor-Levy, Bar-Ilan University

Netta Perry, Bar Ilan University

Taly Shechter, Bar Ilan University

3/27/22

Strand 5: College Science Teaching and Learning (Grades 13-20)

Related Paper Set-The Missing Materials in College Science Learning: Intersections of Materiality, Agency, and Disciplinary Inquiry

3:00 PM-4:30 PM

Discussant: Timothy Atherton, Tufts University

President: Brian E Gravel, Tufts University

Using Conjecture Mapping to Uncover Sociomaterial Entanglements in Introductory Physics Labs

Ian Descamps, Tufts University

Leveraging Material Uncertainty to Support Students' Trajectories of Practice

Robert D. Hayes, Tufts University

Julia Gouvea, Tufts University

Aditi Wagh, Massachusetts Institute of Technology

Curating Materials for Epistemic Agency

Leslie Atkins Elliott, Boise State University

Shakayla Moran, Boise State University

Developing Disciplinary Relationships in Computational Physics

Ezra Gouvea, Tufts University

Brian E Gravel, Tufts University

Timothy Atherton, Tufts University

3/27/22

Strand 6: Science Learning in Informal Contexts

SC-organized paper set-Emerging research in Informal Science

3:00 PM-4:30 PM

Presider: Stephanie Teeter, NC State University

Examining the Nature of Canada's Scientific Literacy Through COVID-19 Tweets

Samantha Jewett, University of Western Ontario

Anton Puvirajah, University of Western Ontario

Mohammad Azzam, Western University

Jingrui Jiang, University of Western Ontario

Native Animals, Native Knowledge? An analysis of zoo portrayal of Indigenous Cultures

Jonathan R Bowers, Michigan State University

Gail Richmond, Michigan State University

The Portuguese Maritime Voyages: the exploration of the history of a city with an App

Cláudia Faria, Instituto De Educação Da Universidade De Lisboa

Elsa Guilherme, Instituto de Educação da Universidade de Lisboa

Joaquim Pintassilgo, Instituto de Educação da Universidade de Lisboa

Maria João Mogarro, Instituto de Educação da Universidade de Lisboa

Ana Sofia Pinho, Instituto de Educação da Universidade de Lisboa

Mónica Baptista, Instituto de Educação da Universidade de Lisboa

Isabel Chagas, Instituto de Educação da Universidade de Lisboa

Cecília Galvão, Instituto de Educação da Universidade de Lisboa

3/27/22

Strand 7: Pre-service Science Teacher Education

Symposium-Building an Elementary Science Teacher Education Community to Advance Equity and Justice

3:00 PM-4:30 PM

Discussant: Felicia Mensah, Teachers College, Columbia University

President: Christa Haverly, Northwestern University

Building an Elementary Science Teacher Education Community to Advance Equity and Justice

Christa Haverly, Northwestern University

Terrance Burgess, Michigan State University

Marti Canipe,

Tina Cheuk, Stanford University

Judith A. Cooper-Wagoner, University of Arizona

Amal Ibourk, Florida State University

Thomas J McKenna, Boston University

Meenakshi Sharma, Michigan State University

Christina V. Schwarz, Michigan State University

Felicia Moore Mensah, Teachers College, Columbia University

Elizabeth A. Davis, University of Michigan

Kristin L. Gunckel, University Of Arizona

3/27/22

Strand 7: Pre-service Science Teacher Education

SC-organized paper set-Exploring challenges of PCK development in pre-service teacher education

3:00 PM-4:30 PM

President: Stephen L. Thompson, University of South Carolina

Catalyst or Catastrophe: Examining the Influence of the edTPA on Preservice Science Teachers' PCK Development (Virtual)

Matt Reynolds, North Carolina State University

Soonhye Park, North Carolina State University

Examining elementary pre-service teachers' competence of questioning in leveraging students' conceptual understanding (Virtual)

Jianlan Wang, Texas Tech University

Yuanhua Wang, West Virginia University

Yanhong Guo, Texas Tech University

Shawn Kashef, University of Georgia

Examining Pre-Service Physics Teachers' Pedagogical Content Knowledge – A Sequence of Proficiency Levels

Dustin Schiering, IPN – Leibniz Institute for Science and Mathematics Education, Kiel, Germany

Stefan Sorge, IPN – Leibniz Institute for Science and Mathematics Education, Kiel, Germany

Melanie Keller, IPN – Leibniz Institute for Science and Mathematics Education, Kiel, Germany

Knut Neumann, IPN – Leibniz Institute for Science and Mathematics Education, Kiel, Germany

3/27/22

Strand 10: Curriculum and Assessment

Related Paper Set-Bringing researcher perspectives and research-based approaches to the design of instructional materials for broad use

3:00 PM-4:30 PM

Discussant: Brian Reiser, Northwestern University

Presenter: Daniel C. Edelson, BSCS Science Learning

Bringing a Science Education Research Perspective to the Development of Instructional Materials for Broad Use

Daniel C. Edelson, BSCS Science Learning

Brian J. Reiser, Northwestern University

Katherine L. McNeill, Boston College

William R. Penuel, University of Colorado

Shelly LaDoux, The Dana Center

Addressing Tensions Inherent in Using Student Surveys to Make Equitable Decisions about Phenomenon Selection

Zoe E. Buck Bracey, BSCS

Lindsey Mohan, BSCS Science Learning

Jamie D Noll, Northwestern University

Designing middle school science curricula 'by states, for states'

Audrey Mohan, BSCS Science Learning

Michael J. Novak, Northwestern University

Shafiq Chaudhary, New Mexico Public Education Department

Hillary Paul Metcalf, Massachusetts Department of Elementary and Secondary Education

3/27/22

Strand 11: Cultural, Social, and Gender Issues

Symposium-Analytic Approaches to Studying Identity Work Longitudinally

3:00 PM-4:30 PM

Presider: Alison Mercier, University of Wyoming

Analytic Approaches to Studying Identity Work Longitudinally

Alison Mercier, University of Wyoming

David Segura, Beloit College

Zahra Hazari, Florida International University

Heidi B. Carlone, Vanderbilt University

Edna Tan, University Of North Carolina At Greensboro

Lucy Avraamidou, University Of Groningen

Robert H. Tai, University Of Virginia

Louise Archer, UCL Institute of Education

Henriette T. Holmegaard, University Of Copenhagen

Bryan A. Brown, Stanford University

3/27/22

Strand 11: Cultural, Social, and Gender Issues

SC-organized paper set-Belonging and Retention in Postsecondary STEM

3:00 PM-4:30 PM

Presider: Ene Ernst Hoppe, University of Copenhagen

Retaining Underrepresented Minorities in STEM Majors: The Role of Mentoring in the First Year

Stacy Olitsky, Saint Joseph's University

What is the Science when Talking Science Identity? Reflections from a Higher Education Biology Perspective.

Katerina P. Günter, Centre for Gender Research, Uppsala University, Uppsala, Sweden

Carolina De Barros Vidor, Department of Education, Uppsala University, Uppsala, Sweden

Annica Gullberg, Teaching in STEM, KTH, Royal Institute of Technology, Stockholm, Sweden

Building Bridges: An Intervention to Improve Academic Outcomes for Underrepresented "Minority" Students in General Chemistry

Natasha H. Johnson, University of Toledo

Hands-On Learning About Inclusion in an Undergraduate Physics Lab

Kim-Alessandro Weber, Leibniz Universitaet Hannover, Institute for Mathematics and Physics Education

Rüdiger Scholz, Leibniz Universitaet Hannover, Institut fuer Quantenoptik

Gunnar Friege, Leibniz Universitaet Hannover, Institute for Mathematics and Physics Education

3/27/22

Strand 12: Technology for Teaching, Learning, and Research

SC-organized paper set-Using Representations, Data, and Graphing to Support Concept Development

3:00 PM-4:30 PM

President: Catherine Quinlan, Howard University, School of Education

Supporting middle school students to integrate graph data with physical science content

Phillip A. Boda, University of California, Berkeley

Emily Harrison, University of California, Berkeley

Marcia C. Linn, University of California-Berkeley

Applying visual highlighting techniques to support students' understanding in Organic chemistry (Virtual)

Nicole Graulich, Justus-Liebig Universität Giessen

Marc Rodemer, IPN Kiel

Julia Eckhard, Justus-Liebig-University Giessen

Sascha Bernholt, IPN Kiel

The Role of Individual Differences in Working Memory Capacity When Comprehending Visualizations With Relative Data and Seductive Details

Kristine A. Antonyan, University of Florida

Poorya M. Shidfar, University of Florida

Do Hyong Koh, University of Florida

Pavlo D. Antonenko, University Of Florida

Will CTCA Help Students' Understanding of Difficult Concepts In Computer Studies?

Mariyam Pentho Abdulhadi, ACEITSE-Lagos State University

Peter A. Okebukola, ACEITSE-Lagos State University

Fred Awaah, University of Professional Studies Accra

Adekunle Ibrahim Oladejo, ACEITSE – Lagos State University

Deborah Oluwatosin Agbanimu, ACEITSE-Lagos State University

3/27/22

Strand 14: Environmental Education and Sustainability

SC-organized paper set-Exploring literacies in environmental education and education for sustainable development

3:00 PM-4:30 PM

Presider: Jean-Philippe Ayotte-Beaudet, Université De Sherbrooke

A systematic literature review: assessing sustainability literacy

Rolf Saarna, University of Tartu

Anne Laius, University of Tartu

Creative and Digital Pedagogies for Teaching Ocean Literacy: The Ocean Connections Project

Lindsay Hetherington, University of Exeter

Justin S Dillon, University of Exeter

Birgitte Lund Nielsen, VIA University College

Harald Brandt, VIA University College

Maria MJ Malmierca, CESGA

Equipping the Young to Tackle Current Societal Challenges

Giulia Tasquier, University of Bologna

Erik Knain, University of Oslo

Alfredo Jornet, University of Oslo

Fostering Environmental Literacy through Engagement in Self-Regulation Learning Processes

Michal Zion, Bar Ilan University, School of education

Guly Ortal-Ivry, Bar Ilan University, School of education

Idit Adler, Tel Aviv University, School of Education

3/27/22

Research Committee

Admin Symposium-Global Perspectives from the Handbook of Research on Science Education, Volume III

3:00 PM-4:30 PM

Presiders:

Dana L Zeidler, University of South Florida

Judith S Lederman, Illinois Institute of Technology

Introduction and Overview

Dana L Zeidler, University of South Florida

Judith S Lederman, Illinois Institute of Technology

Norman G Lederman, Illinois Institute of Technology

Section I. Theory and Methods of Science Education Research

William Boone, Miami University

Section II. Science Learning

Richard A Duschl, Southern Methodist University

Section III. Diversity and Equity in Science Learning

Cory A Buxton, Oregon State University

Section IV. Science Teaching

Jan van Driel, University of Melbourne

Section V. Curriculum and Assessment in Science

Bronwen Cowen, The University of Waikato, Hamilton

Section VI. Science Teacher Education

Saouma Boujaoude, American University of Beirut

Norman G Lederman, Illinois Institute of Technology

3/27/22

Admin Symposium-Graduate Student Research Symposium

3:00 PM-4:30 PM

Graduate Student Research Symposium

Scott Cohen, Georgia State University

Theila Smith, University of Gorningen

Timothy G. Klavon, Black Hills State University

Helena Aptyka, University of Cologne

Mohammed Estaiteyeh, Western University

Andrea Reeder, Middle Tennessee State University

Chelsea Sexton, University of Georgia

Klaudja Caushi, University Of Massachusetts - Boston

Karen Woodruff, Montclair State University

3/27/22

Multi-Strand

Virtual Session A

3:00 PM-4:30 PM

Teaching and Learning Floating and Sinking: a Metaanalysis (Virtual)

Martin Schwichow, PH Freiburg

Anastasios Zoupidis, Democritus University of Thrace

How Do Students Make Sense of Simultaneous Synthesis Physics Tasks? (Virtual)

Bashirah Ibrahim, Bahrain Teachers College, University of Bahrain

Lin Ding, Ohio State University

Pedagogy in practice: exploring the use of pedagogy course knowledge by learning assistants (Virtual)

Vera Degtiareva, Boston University

Emily C. Allen, Boston University

Andrew Duffy, Boston University

Manher Jariwala, Boston University

Physics Education Curriculum from the decoloniality lens: a Brazilian case study (Virtual)

Carlos Mometti, University of São Paulo

Tanja Tajmel, Concordia University

Mauricio Pietrocola, University of São Paulo

3/27/22

Strand 2: Science Learning: Contexts, Characteristics and Interactions

SC-organized paper set-Middle School Science Teaching & Learning

4:45 PM-6:15 PM

Presider: Harini Krishnan, Florida State University

An Investigation of Teaching and Learning Approaches Influencing Students' Intrinsic Motivation towards Science Learning: A Longitudinal Analysis from Grade 6 to 9

Moonika Teppo, University Of Tartu

Regina Soobard, University Of Tartu

Miia Rannikmae, University Of Tartu

Exploring Student- and Teacher-Level Characteristics on Middle School Students' Engagement in Life Science Classes

Zeynep Gonca Akdemir, Purdue University

Muhsin Menekse, Purdue University

Selcen Guzey, Purdue University

Teaching and Learning Kinematics: A Comparison of two Approaches

Gunnar Friege, University of Hannover Physics Education Group

Ingmar Schneider, University of Hannover Physics Education Group

The Effect of Multi-Faceted Holistic Approach in Science Instruction on Students' Achievements, Preferences, and Needs

Oshra Aloni, Bar-ilan University

Michal Zion, Bar-Ilan University

Ornit Spektor-Levy, Bar-Ilan University

3/27/22

Strand 2: Science Learning: Contexts, Characteristics and Interactions

Related Paper Set-Students and teachers' challenges explaining the mechanism of complex systems and suggestions to address them

4:45 PM-6:15 PM

Presenter: Emil Eidin, Michigan State University

Using concept maps to evaluate preservice biology teachers' conceptualization of Covid-19 as a complex phenomenon

Tom Bielik, Freie Universität Berlin

Moritz Krell, Freie Universität Berlin

Johannes Jageman,

Dirk Krueger, Freie Universitaet Berlin

Orit Ben Zvi Assaraf, Ben-Gurion University Of the Negev, Israel

Developing a Coherent Understanding of Biology Through a Complex Systems Lens

Susan Yoon, University of Pennsylvania

Katherine Miller, University of Pennsylvania

Leveraging causal heuristics to scaffold student understanding in dynamic system models

Lynn Stephens, The Concord Consortium

Steve Roderick , The Concord Consortium

Comparing how students' conceptual understanding and computational model explain system mechanisms in time-based phenomena

Emil Eidin, Michigan State University

Jonathan Bowers, Michigan State University

3/27/22

Strand 3: Science Teaching — Primary School (Grades preK-6): Characteristics and Strategies

SC-organized paper set-Professional Development of Science Teachers

4:45 PM-6:15 PM

President: Selina L. Bartels, Valparaiso University

Empirically Grounding a Learning Performances Framework for K-5 Students' Modeling Competency Using Evidence-Centered Design

Florian Böschl, University of Leipzig

Tina Vo, University of Nevada- Las Vegas

Cory T. Forbes, University of Texas Arlington

Kim Lange-Schubert, University of Leipzig

Learning to Care for Students as Science Sensemakers: Preservice Elementary Teachers' Noticing and Epistemic Empathy

Ruveyde A. Kaya, Florida State University

Jennifer Schellinger, Florida State University

Sherry A. Southerland, Florida State University

Kirby Whittington, The University of Utah

Samantha Skrob-Martin, Florida State University

The Role of Responsibilist Intellectual Virtues in Science Learning

Ronald W Rinehart, University of Northern Iowa

Mason Kuhn, University of Northern Iowa

Todd Milford, University of Victoria

Utilizing lesson study to lay the foundation for preservice teachers to begin shaping elementary students' scientific literacy

Selina L. Bartels, Valparaiso University

3/27/22

Strand 4: Science Teaching — Middle and High School (Grades 5-12): Characteristics and Strategies

SC-organized paper set-Science teaching practices in secondary content areas

4:45 PM-6:15 PM

Presider: Ella Ofek-Geva, Weizmann Institute of Science

Assessment of chemistry teacher student's diagnostic competencies in the Simulated Chemistry Classroom (SiCC).

Sascha Wittchen, Freie Universität Berlin

Claus Bolte, Freie Universität Berlin

Nils Machts, Christian-Albrechts-Universität zu Kiel

Capturing a Teacher's Multidimensional and Dynamic Attention to Student Learning in Design-Based Chemistry Education

Hanna Stammes, Delft University of Technology & Radboud University

Ineke Henze, Radboud University

Marc de Vries, Delft University of Technology

Erik Barendsen, Radboud University & Open University

Examining the Relative Effectiveness of CTCA in Improving Secondary School Students' Achievement in Genetics

Israel O. Adebayo, ACEITSE-Lagos State University

Peter A. Okebukola, ACEITSE-Lagos State University

Adekunle I. Oladejo, ACEITSE-Lagos State University

I am CTCA, and this is my first Attempt in the Physics Class - How Will I perform?

Adekunle Ibrahim Oladejo, ACEITSE-Lagos State University

Peter A. Okebukola, ACEITSE-Lagos State University

Israel Oludotun Adebayo, ACEITSE-Lagos State University

Gabriel Korede Adeosun, ACEITSE-Lagos State University

Deborah Oluwatosin Agbanimu, ACEITSE-Lagos State University

Franklin U. Onowugbeda, ACEITSE-Lagos State University

Ibukunolu Adebisi Ademola, ACEITSE-Lagos State University

Esther Oluwafunmilayo Peter, ACEITSE-Lagos State University

Olasunkanmi Adio Gbeleyi, ACEITSE-Lagos State University

Fred Awaah, University of Professional Studies Accra

3/27/22

Strand 6: Science Learning in Informal Contexts

SC-organized paper set-Engaging youth in STEM through informal learning experiences

4:45 PM-6:15 PM

Presider: Laura Dell, University of Cincinnati

A meta-synthesis on the impact of informal STEM programs on STEM major and STEM career awareness, interest, and engagement

Bobby Habig, American Museum of Natural History

Preeti Gupta, American Museum of Natural History

Jennifer Adams, University Of Calgary

Mandë Holford, Hunter College

Enhancing Gifted Students' Attitudes toward STEM: An Insight from a Research Apprenticeship Program

Shuchen Guo, Nanjing Normal University

Enshan Liu, Beijing Normal University

Cheng Liu, Beijing Normal University

Hailan Wang, Xiangyang No. 5 Middle School

Youth Science Identity and Perspectives of Scientists after Participation in a STEM-based Afterschool Program (Virtual)

Devon M Christman, University of California, Santa Barbara

Kassandra Ortega, University of California, Santa Barbara

Nathalie Paesler, University of California, Santa Barbara

Alexandria Muller, University of California- Santa Barbara

Diana J Arya, University of California, Santa Barbara

3/27/22

Strand 7: Pre-service Science Teacher Education

SC-organized paper set-Centering social justice in science teacher education

4:45 PM-6:15 PM

President: Myunghwan Shin, California State University, Fresno

"Kinda awful.I spent a lot of time crying":Attending to the Emotions of PSTs of Color

Victor Kásper, Florida State University

Shannon G. Davidson, Florida State University

Lama Jaber, Florida State University

Learning Antiracist and Socially Just STEM Teaching Within an Embedded, Place-Based Model of Teacher Education

Rachael M. Gordon, University of Michigan

STEM Education through Abolitionist Teaching: A Research-Practice Partnership to Support Virtual Microteaching Experiences

Vanessa Grady, Georgia State University

Natalie S. King, Georgia State University

3/27/22

Strand 7: Pre-service Science Teacher Education

SC-organized paper set-Cultivating positive dispositions toward science teaching

4:45 PM-6:15 PM

Presider: Lezly Taylor, Virginia Polytechnic Institute and State University

Attitudes of Preservice Elementary Science Teachers toward iSTEM Teaching: The Role of Adaptive Expertise

Mounir R. Saleh, Bahrain Teachers College, University of Bahrain

Bashirah Ibrahim, Bahrain Teachers College, University of Bahrain

Preservice Science Teachers' Implementation and Self-Efficacy About The Science And Engineering Practices

Fatma Kaya, Middle Tennessee State University

Lisa A. Borgerding, Kent State University

Shannon Navy, Kent State University

Systematic Assessment of Future Primary School Teachers' Interests in Science

Steffen Wagner, Humboldt-Universität zu Berlin

Burkhard Priemer, Humboldt-Universität zu Berlin

Doris Lewalter, Technical University Munich

3/27/22

Strand 8: In-service Science Teacher Education

SC-organized paper set-Impact of Unique Professional Development Foci

4:45 PM-6:15 PM

Presenter: Avraham Merzel, The Hebrew University of Jerusalem

Changes in Teacher Thinking about Enactment Influenced by a PD about an NGSS-Aligned Storyline Unit

Nessrine Machaka, University of Illinois At Urbana - Champaign

Stina Krist, University of Illinois at Urbana-Champaign

Creating Unity and Inclusion Through Developing the Research Team Teacher Role

Aline Gjelij, Dual Language Middle School, New York, NY

Jessica White, Benjamin Syms Middle School, Hampton, VA.

Elaine V Howes, American Museum of Natural History

Jamie Wallace, American Museum of Natural History

Elizabeth Edmondson, Virginia Commonwealth University

The enactment of professional development principles in a collaborative project between science and RE teachers

Ann Childs, University of Oxford

Liam Guilfoyle, University of Oxford

3/27/22

Strand 10: Curriculum and Assessment

Related Paper Set-Engaging with Curricular Infrastructure to Support Elementary Science Teacher Learning and Identity Development

4:45 PM-6:15 PM

Presider: Christa Haverly, Northwestern University

Curriculum Materials Adoption Processes: Teacher Learning in an Organizational Routine

Christa Haverly, Northwestern University
Emily Rose Seeber, University of Michigan
Elizabeth A. Davis, University of Michigan
James P Spillane, Northwestern University
Angela Lyle, University of Michigan

Supporting Early Elementary Science and Literacy Teaching: The Synergy of Pedagogical Tools

Amelia Wenk Gotwals, Michigan State University
Amber S. Bismack, Oakland University
Samantha Danzinger,
Arianna Pikus, Michigan State University
Tanya S Wright, Michigan State University
Miranda S. Fitzgerald, University of North Carolina At Charlotte

Collaborative Development of Tools to Address Content-Practice Tensions in Classroom Science Investigations

Eve Manz, Boston University School of Education
Chris Georgen, Boston University
Betsy Beckert,

Supporting Elementary Teachers in Enacting Curricular Reform and Reform-based Science Instruction

Christina Siry, University Of Luxembourg
Sara E. Wilmes, University of Luxembourg
Kerstin Te Heesen, University of Luxembourg

3/27/22

Strand 11: Cultural, Social, and Gender Issues

SC-organized paper set-Black STEM Professionals and STEM Teaching, Learning, and Engagement

4:45 PM-6:15 PM

President: Mary M. Atwater, University Of Georgia

Centering Black Scientists' Lived Experiences : A Context for Culturally and Linguistically Embedded Science

Gillian U Bayne, Lehman College of the City University of New York

Mentorship to Combat Loneliness, Bridge Opportunity Gaps, and Fight Underrepresentation in STEM Disciplines

Veeshan Narinesingh, Department of Physics The Graduate Center of The City University of New York

Farrah Simpson, Department of Physics Brown University

Tracy Edwards, Department of Physics Michigan State University

Milena Chakraverti-Wuerthwein, The Harlem Gallery of Science

Exploring Racism in the Undergraduate and Graduate School Choices of Scientists and Engineers: Counterspaces for Black men in S&E

Shari Watkins, American University

Brian McGowan, American University

3/27/22

Strand 12: Technology for Teaching, Learning, and Research

Symposium-Applying epistemic heuristics to characterize student reasoning about mechanisms with computational tools

4:45 PM-6:15 PM

Discussant: Christina Krist, University of Illinois, Urbana Champagne

Presenter: Elon Langbeheim, Ben-Gurion University of the Negev, Israel

Reasoning about interactions when constructing mechanistic explanations

Michal Haskel-Ittah, Weizmann Institute of Science, Israel

Rami Marely, Weizmann Institute of Science, Israel

Smadar Szekely, Weizmann Institute of Science, Israel

Reasoning about clogging in crowd evacuation through bottlenecks

Elon Langbeheim, Ben-Gurion University of the Negev, Israel

Shani Ben-Hamo, Ben-Gurion University of the Negev, Israel

Stav Shapira, Ben-Gurion University of the Negev, Israel

Student Use of Epistemic Heuristics at the Intersection of Science and Social Justice

Allison Bradford, University of California, Berkeley

Libby Gerard, University of California, Berkeley

Marcia Linn, University of California, Berkeley

Reasoning about heat transfer while examining the relationships between physical experiment and computer model (Virtual)

Tamar Fuhrmann, Stanford University

Carmel Bar, Weizmann Institute of Science, Israel

Paulo Blikstein, Teachers College, Columbia University

3/27/22

Strand 14: Environmental Education and Sustainability

SC-organized paper set-Innovative approaches in environmental science education

4:45 PM-6:15 PM

President: K. C. Busch, North Carolina State University

[Program Name]: Powering the Science Learning Process with Co-Created Citizen Science

Ruth Kermish-Allen, Maine Mathematics and Science Alliance

Alexandria Brasili, Maine Mathematics and Science Alliance

Assessing Elementary Students Ability to Make Informal Observations About Living Organisms Outdoors

Jean-Philippe Ayotte-Beaudet, Université De Sherbrooke

Abdelkrim Hasni, Université de Sherbrooke

Valérie Vinuesa, Université de Sherbrooke

Élise Rodrigue-Poulin, Université de Sherbrooke

Gabriela Quintela Do Carmo, Columbia University in the City of New York

Étienne Gendron, Université de Sherbrooke

Bringing the Outside In and Inside Out: Connecting Socioemotional Learning with Science

Ava Marie Gibler, California Polytechnic State University, San Luis Obispo

Alexis Van Howe, California Polytechnic State University, San Luis Obispo

Jasmine McBeath Nation, California Polytechnic State University, San Luis Obispo

Kurt Holland, California Polytechnic State University, San Luis Obispo

Marine Science, Climate Change, and the NGSS: Lessons Learned from an Initial Round of PD

Lauren Madden, The College of New Jersey

Louise Ammentorp, The College of New Jersey

Nathan Magee, The College Of New Jersey, Physics Department

Graceanne Taylor, Save Barnegat Bay

3/27/22

Research Committee

Admin Symposium-Latinx Science Learners and Scientific Literacy: Successes and Challenges

4:45 PM-6:15 PM

Latinx Science Learners and Scientific Literacy: Successes and Challenges

Regina Suriel, Valdosta State University

Alejandro J. Gallard, Georgia Southern University

Angela Chapman, University Of Texas Rio Grande Valley

Lizette de Robles,

Diego F. Rojas-Perilla, Teachers College, Columbia University

Enrique H Suarez,

Tatiane Russo-Tait, University of Texas At Austin

Diana Camacho, Oregon State University

3/27/22

Equity And Ethics Committee

Admin Symposium-Jhumki Basu Poster Symposium

4:45 PM-6:15 PM

Organizers

María González-Howard, University of Texas at Austin

Justina Ogado, Baylor University

Sara Sallom, University of Balamand, Lebanon

Enrique Suarez, University of Massachussetts, Amherst

Jenny Norman, University of Minnesota

Critical Approaches Leveraging Technology In Science Education

Phillip A. Boda, University of Illinois at Chicago

Towards Liberating Methods: Ethnodance as an Embodied Narrative of Black Students' Science Identity

Mindy J. Chappell, University of Illinois at Chicago

Meaningful Assessment of Engineering Experts' and Teachers' Conceptions of Nature of Engineering

Erdogan Kaya, George Mason University

Ezgi Yesilyurt, Weber State University

Hasan Deniz, University of Nevada Las Vegas

Learning How to Mean Through Multimodality Embedded in Modeling – “Scientifically” Speaking (Virtual)

Ayca K. Fackler, University of Georgia

Exploring Students Mechanistic Reasoning Within the Context of Resource Oriented Instructional Materials

Clausell Mathis, University of Washington

Lisa Goodhew, Seattle Pacific University

Paula Heron, University of Washington

Experiences of prospective and novice science teacher educators during the design of k-12 science methods courses

José Pavez, University of Georgia

Experiences of School Science Coordinators During the COVID-19 Pandemic: An International Perspective

Harleen Singh, Medaille College

Hong H. Tran, University of Georgia

Hatice Ozen-Tasdemir, University of Georgia

Yuxi Huang, University of Georgia

Julie A. Luft, University of Georgia
Brooke A. Whitworth, Clemson University

Machine Learning Scoring Bias on Students that are Underrepresented in STEM
Xiaoming Zhai, University of Georgia

3/27/22

Multi-Strand

Virtual Session B

4:45 PM-6:15 PM

High School Students' Emergent Positions from Science Internships (Virtual)

Pei-Ling Hsu, University Of Texas At El Paso

Dina Thomason, University Of Texas At El Paso

Citizen Science in School: the Case of the Invasion of Wild Boars (Virtual)

Keren Sarah Levy, Technion - Israel Institute Of Technology

Keren Mintz, Technion - Israel Institute Of Technology

Tali Tal, Technion - Israel Institute Of Technology

Writing Science in English at College: Non-Anglophone Students' Participation in Epistemic Practices (Virtual)

Luciana Martiliano Milena, Universidade Federal Do ABC

Danusa Munford, Universidade Federal de Minas Gerais

Priscila C. Fernandes, Universidade Federal de Sao Joao del Rei

Motivations of Scientists and Teachers to Collaborate in School-Based Citizen Science Projects (Virtual)

Osnat Atias, University of Haifa

Ayelet Baram-Tsabari, Technion - Israel Institute of Technology

Ayelet Shavit, Technion - Israel Institute of Technology

Yael Kali, University of Haifa

3/28/22

Strand 1: Science Learning: Development of student understanding

SC-organized paper set-Pedagogical Approaches to Enhance Science Understanding

8:00 AM-9:30 AM

President: Tammy M. Long, Michigan State University

*APPLYING ART-BASED METHODS TO TALK WITH CHILDREN ABOUT NATURE,
TECHNOLOGY AND HEALTH*

Ene Ernst Hoppe, University of Copenhagen

Katia Bill Nielsen, University of Copenhagen

Henriette T. Holmegaard, University Of Copenhagen

Please Mind the Gap: Black Boxes as a Pedagogical Construct in the Biology Classroom

Gur Arie Livni Alcasid, Department of Science Teaching, Weizmann Institute of Science

Michal Haskel Ittah, The Weizmann Institute Of Science

Student Depictions of the Engineering Design Process

Alexandria Muller, University of California- Santa Barbara

Marco Barron, University of California- Santa Barbara

Devon M Christman, UCSB

Ron Skinner, MOXI, The Wolf Museum of Exploration + Innovation

Danielle Boyd Harlow, University Of California At Santa Barbara

The interplay between students' motivational profiles and science learning

Marcus Kubsch, IPN - Leibniz Institute for Science and Mathematics Education

David L. Fortus, Weizmann Institute Of Science

Knut Neumann, Leibniz Institute for Science Education (IPN) Kiel

Jeffrey Nordine, Leibniz Institute for Science and Mathematics Education (IPN)

Joseph S. Krajcik, Michigan State University

3/28/22

Strand 2: Science Learning: Contexts, Characteristics and Interactions
SC-organized paper set-Science Teaching & Learning during the Pandemic

8:00 AM-9:30 AM

President: Wanja Gitari, University of Toronto

Investigating the Triple Threat of COVID-Necessitated Online Engineering Courses to Diverse Students' Sense of Belonging

Thomas R. Tretter, University of Louisville

Brian S Robinson, University of Louisville

Jessica B Buckley, University of Louisville

Alex Hammond, University of Louisville

Reimagining Virtual Participatory Design Research: Supporting Youth's Rightful Presence in a Community Science Project

Rishi Krishnamoorthy, Rutgers University

Edna Tan, University Of North Carolina At Greensboro

Ravit Golan Duncan, Rutgers University

Frieda Reichsman, The Concord Consortium

Sarah Haavind, The Concord Consortium

Tiahna Selby, Rutgers University

Burrell Smithen, Rutgers University

Tasha Austin, Rutgers University

Student emotional engagement through the emergency transition to online learning due to COVID-19

Emma Wester, Donald Danforth Plant Science Center

Lisa L. Walsh, Donald Danforth Plant Science Center

Kristine Callis-Duehl, Donald Danforth Plant Science Center

Student Interest, Concerns and Information-Seeking Behaviors Related to Covid-19 (Virtual)

Jamie Elsner, University of North Carolina at Chapel Hill

Troy D Sadler, University of North Carolina at Chapel Hill

Laura Zangori, University Of Missouri

Patricia J. Friedrichsen, University Of Missouri–Columbia

Li Ke, University of North Carolina at Chapel Hill

3/28/22

Strand 4: Science Teaching — Middle and High School (Grades 5-12): Characteristics and Strategies

SC-organized paper set-Designing and enacting pedagogy for secondary classrooms

8:00 AM-9:30 AM

Presider: Avraham Merzel, The Hebrew University of Jerusalem

Effects of pedagogical interruptions on secondary student interest, engagement, and comprehension of narrative science videos.

Matthew Kloser, University Of Notre Dame

Michael Szopiak, University of Notre Dame

Catherine Wagner, University of Notre Dame

Exploration of Teacher Discursive Claims Enacting Social Justice Pedagogy in 7th grade Science

Fredrica Nash, The George Washington University

The agile educator: investigating science teachers' pedagogical capacity to design subject-specific up-to-date citizenship lessons

Ineke Henze-Rietveld, Delft University of Technology & Radboud University

Erik Barendsen, Radboud University & Open University

Dury Bayram Jacobs, Eindhoven University of Technology

3/28/22

Strand 5: College Science Teaching and Learning (Grades 13-20)

SC-organized paper set-Collaboration to Promote Learning

8:00 AM-9:30 AM

President: Abdirizak M. Warfa, University of Minnesota

Analyzing an Interdisciplinary Education and Science/Engineering Team's Interactions Using Activity Theory

Katherine McCance, North Carolina State University

Stephanie Teeter, NC State University

Margaret R. Blanchard, NC State University

Richard Venditti, NC State University

Engineering Design in Introductory Physics: Undergraduate Students' and Graduate Teaching Assistants' Perceptions

Amir Bralin, Purdue University

Thomas Chapman, Purdue University

Jason Morphew, Purdue University

Carina M. Rebello, Purdue University

N Sanjay Rebello, Purdue University

MOLECULAR ORBITAL THEORY IN ENTRY-LEVEL UNIVERSITY CHEMISTRY - A COMPUTER-SUPPORTED COLLABORATIVE INTERVENTION

David J Hauck, TU Dortmund University

Insa Melle, TU Dortmund University

Understanding Scientists,' Engineers,' and Educators' Perceptions of Collaboration and Interdisciplinarity: National Survey Validation and Results

Katherine R McCance, North Carolina State University

Margaret R. Blanchard, NC State University

3/28/22

Strand 5: College Science Teaching and Learning (Grades 13-20)

SC-organized paper set-Problem Solving and Critical Thinking

8:00 AM-9:30 AM

President: Rebecca S. Eagle-Malone, The University of Akron

Heartbreak for Underachievement: Perspectives of CTCA on Students' Achievement and Critical Thinking in Computer Studies

Olasunkanmi Adio Gbeleyi, ACEITSE- Lagos State University

Peter A. Okebukola, ACEITSE- Lagos State University

Ibukunolu Adebisi Ademola, ACEITSE-Lagos State University

Franklin U. Onowugbeda, ACEITSE- Lagos State University

Fred Awaah, University of Professional Studies Accra

Esther Oluwafunmilayo Peter, ACEITSE- Lagos State University

Deborah Oluwatosin Agbanimu, ACEITSE-Lagos State University

Adekunle Ibrahim Oladejo,

Ashimi B. Ganiyyu, Lagos State University

Hussein T. Abdulazeez, Lagos State University

Investigating the effect of context-based teaching on students' science engagement and perceptions of utility value (Virtual)

Ya-Chun Chen, Institute of Education, National Yang Ming Chiao Tung University

Perspectives on generalizability in problem-solving from undergraduate physics students: Influences of a mastery homework approach

Kevin Hall, University of Illinois at Urbana-Champaign

Stina Krist, University of Illinois at Urbana-Champaign

Eric Kuo, University of Illinois at Urbana-Champaign

Joshua Rosenberg, University of Tennessee

Strategies undergraduate students use to solve a volumetric analysis problem before and after instruction. (Virtual)

Ted M. Clark, The Ohio State University

Nicole Dickson-Karn, The Ohio State University

3/28/22

Strand 7: Pre-service Science Teacher Education

SC-organized paper set-Innovation and enhancement of science practices

8:00 AM-9:30 AM

President: Hartley Banack, University of Northern British Columbia (UNBC)

Investigating Preservice Secondary STEM teachers' Reflective Practice in a Microteaching Context

Deepika Menon, University of Nebraska-Lincoln

Rosetta Ngugi, Kennesaw State University

Preservice Science Teachers' Descriptions of Simulation-enhanced Inquiry-based Lesson for Asynchronous Learning Environments

Ilgim Ozergun, Bogazici University

Sevil Akaygun, Bogazici University

Science and Engineering Practices and Cognitive Demand Present in Preservice Teachers' Planning and Instruction

Donna Governor, University of North Georgia

April Nelms, University of North Georgia

Virtual Rehearsal Simulations as Authentic Practice Spaces for Developing Scientific Discourse Skills

Tammy D. Lee, East Carolina University

Carrie Lee, East Carolina University

Mark H. Newton, East Carolina University

Jennifer Gallagher, East Carolina University

Paul Vos, East Carolina University

Daniel L. Dickerson, East Carolina University

Bonnie B. Glass, East Carolina University

3/28/22

Strand 8: In-service Science Teacher Education

Symposium-The Role of Emotions in Science Teacher Education and Professional Development

8:00 AM-9:30 AM

Discussant: Maria Varelas, University Of Illinois At Chicago

Presenter: Dana Vedder-Weiss, Ben-Gurion University Of the Negev, Israel,

The Role of Emotions in Science Teacher Education and Professional Development

Arnau Amat, University Of Vic

Alberto Bellocchi, Queensland University of Technology

Shannon G. Davidson, Florida State University

Vesal Dini, Tufts University

Lama Jaber, Florida State University

Laura Martin Ferrer, University Of Vic

Rotem Trachtenberg-Maslaton, Ben Gurion University of the Negev

Karin Tsarfati-Shaulov, Ben Gurion University of the Negev

Dana Vedder-Weiss, Ben-Gurion University Of the Negev, Israel

Maria Varelas, University Of Illinois At Chicago

3/28/22

Strand 8: In-service Science Teacher Education

Symposium-The Handbook of Research in Science Teacher Education: Current and Future Directions for Research

8:00 AM-9:30 AM

President: Jose M. Pavez, University of Georgia

The Handbook of Research in Science Teacher Education: Current and Future Directions for Research

Julie A. Luft, University of Georgia

Gail Jones, North Carolina State University

Sarah J. Carrier, North Carolina State University

David F. Jackson, University Of Georgia

Lauren Madden, The College of New Jersey

Soonhye Park, North Carolina State University

Rachel Mamlok-Naaman, The Weizmann Institute of Science

Jose M. Pavez, University of Georgia

3/28/22

Strand 10: Curriculum and Assessment

Related Paper Set-Research and Practice Perspectives on Developing and Implementing a Three-Dimensional District Biology Assessment

8:00 AM-9:30 AM

A District Perspective on Developing a Three-Dimensional Science Assessment

Sylvia Scoggin, Washoe County School District
Rebecca Curtright, Washoe County School District
Elizabeth X. De Los Santos, University of Nevada, Reno
Candice R. Guy-Gaytán, BSCS Science Learning

A District Perspective on the Use of Science Assessment Data

Rebecca Curtright, Washoe County School District
Sylvia Scoggin, Washoe County School District
Elizabeth X. De Los Santos, University of Nevada, Reno
Candice R. Guy-Gaytán, BSCS Science Learning

Investigating Teachers' Professional Learning Experiences on an Assessment Development Team

Elizabeth X. De Los Santos, University of Nevada, Reno
Candice R. Guy-Gaytán, BSCS Science Learning
Suzanne Lewis, University of Nevada, Reno

Investigating Students' Reasoning on a Practices-based Exam

Candice R. Guy-Gaytán, BSCS Science Learning
Suzanne Lewis, University of Nevada, Reno
Elizabeth X. De Los Santos, University of Nevada, Reno

3/28/22

Strand 11: Cultural, Social, and Gender Issues

Symposium-Indigenizing the Processes of Science and Engineering: Increasing Inclusivity with Implementation of the SEP's

8:00 AM-9:30 AM

Discussant: Pauline Chinn, University of Hawaii at Manoa

President: Julie Robinson, University of North Dakota

Indigenizing the Processes of Science and Engineering: Increasing Inclusivity with Implementation of the SEP's

Julie Robinson, University of North Dakota

Pauline W. U. Chinn, University of Hawaii at Manoa

Frank Bowman, University of North Dakota

Bethany Klemetsrud, University of North Dakota

Bhaskar Upadhyay, University of Minnesota

Rebekah Hammack, Montana State University

Paichi Shein, National Sun Yat-sen University

Peresang Sukinarhimi,

Nick Lux, Montana State University

Paul Gannon, Montana State University

3/28/22

Strand 11: Cultural, Social, and Gender Issues

SC-organized paper set-Considering Gender in Higher Education

8:00 AM-9:30 AM

President: Sara L. Salisbury, Middle Tennessee State University

Durability of Systemic Gendering of STEM in College STEM Students' Definitions of a STEM Person

Heidi Cian, Florida International University

Remy Dou, Florida International University

Influence of Active Goals on Attitudes, Intentions, and Academic Behaviors of STEM Women in an Undergraduate Peer Mentoring Program

Jennifer A. Gatz, Stony Brook University

Angela M. Kelly, Stony Brook University

Monica Bugallo, Stony Brook University

Gender Dynamics During Discourses in SCALE-UP Format of Physics Course: An Exploratory Single Case Study

Mark O Akubo, Florida State University and Cornell University

Sherry A. Southerland, Florida State University

3/28/22

Strand 13: History, Philosophy, Sociology, and Nature of Science

Admin Symposium-The Unnatural Nature of Science without Norm Lederman: Honoring the Legacy of Dr. Norman Lederman

8:00 AM-9:30 AM

The Unnatural Nature of Science without Norm Lederman: Honoring the Legacy of Dr. Norman Lederman

Valarie L. Akerson, Indiana University

Judith S Lederman, Illinois Institute of Technology

Dana L Zeidler, University of South Florida

Renee Schwartz, Georgia State University

Valarie L. Akerson, Indiana University

Fouad Abd-El-Khalick, University Of North Carolina At Chapel Hill

3/28/22

Strand 14: Environmental Education and Sustainability

SC-organized paper set-Lenses on environmental science educators

8:00 AM-9:30 AM

President: Xavier Fazio, Brock University

Assessing Elementary Preservice Teachers' Knowledge, Awareness, Attitude, and Beliefs Toward Environmental Education

Mamta Singh,

Investigating the Knowledge Bases Science Teachers Use When Considering a Socioscientific Issue

Lucas Menke, Drake University

Jerrid Kruse, Drake University

Kinsey Zacharski, Drake University

Sarah Voss, Drake University

Ohio Secondary Science Teachers' Climate Change Instruction

Lisa A. Borgerding, Kent State University

Jennifer Heisler, Kent State University

Breanna Beaver, Kent State University

Understanding How an Environmental Educator Identifies & Thinks about Environmental Issues

Hamza Malik,

Stephen B. Witzig, University Of Massachusetts Dartmouth

3/28/22

Elections Committee

Admin Symposium-Leaders Wanted: Envisioning Pathways to NARST Leadership

8:00 AM-9:30 AM

Leaders Wanted: Envisioning Pathways to NARST Leadership

Bridget K. Mulvey, Kent State University

Melody Russell, Auburn University

Mary M. Atwater, University Of Georgia

Nazan U. Bautista, Miami University

Jeanna R. Wieselmann, Southern Methodist University

3/28/22

Research Committee

Admin Symposium-Sandra K. Abell Institute for Doctoral Students 2021 Poster Symposium

8:00 AM-9:30 AM

Sandra K. Abell Institute for Doctoral Students 2021 Poster Symposium

Asli Sezen-Barrie, University of Maine

Rouhollah Aghasaleh, Humboldt State University

Sara Tolbert, Te Whare Wananga O Waitaha University of Canterbury

Kathryn Scantlebury, University of Delaware

Posters

Phronetic Science: Reflections on the First Virtual SKAIDS in a Social-natural Crisis

Rouhollah Aghasaleh, Humboldt State University

Sara Tolbert, University of Canterbury, New Zealand

Kathryn Scantlebury, University of Delaware, USA

Addressing the diversity issues in Science & Engineering in Ph.D. Programs

Lisa Hanson, Middle Tennessee State University

Be like water: The role of science in social movements towards justice and multi species solidarity

Jenny Tilsen, University of Minnesota

Redefining productive struggle through an asset-based perspective

Clarissa Keen, University of Massachusetts Boston

Design principles for implementing Lesson Study: A professional development model for graduate teaching assistants

Nicole Suarez, University of California San Diego and San Diego State University

Questioning the Core Ideas: Approaching NGSS using a Lens of Ecofeminism

Suzanne Poole Patzelt, Montclair State University

Care and Harm in California Science Teacher Preparation Curriculum

Caroline Spurgin, University of California Santa Cruz

Elements of Humanizing Pedagogy in K-8 Science Teacher Preparation

Dan Moreno, University of Arizona

Learning How to Build Knowledge in Science Through Multimodality Embedded in Modeling
Ayca Fackler, University of Georgia

Historicizing Contemporary Access & Equity Discourses in P-12 Engineering Education Curricular Materials
Natalie De Lucca, Vanderbilt University

"Kinda awful. I spent a lot of time crying": Attending to the Emotions of PSTs of Color
Victor Kásper, Florida State University

Pathways of Indigenous Science in Environmental Conservation of Thai Urban society
Waralee Sinthuwa, Faculty of Education, Kasetsart University

Asset-Based Supplemental Chemistry
Klaudja Caushi, University of Massachusetts Boston

The Tensions of Bridging the Culture of Home and School Science through Ethnic Education in an Indigenous Community in Taiwan
Mu-Yin Lin, The University of Georgia

(Re)defining Teacher Perceptions of Student Science Success to Promote Unity and Inclusion in Science Education
Takeshia Pierre, University of Florida

A portrait of Postsecondary STEM Teaching: mixed-method study examining the influence of identity and context
Sule Aksoy, Syracuse University

Multimodal revoicing: Embodied student resources to support students' explanations of science phenomena
Samuel Lee, Boston College

Equity Audit: Why Aren't the Black Students Showing Up?
Dionne Wilson, Florida State University

3/28/22

Strand 2: Science Learning: Contexts, Characteristics and Interactions
SC-organized paper set-Science Teaching & Learning at the College Level
11:00 AM-12:30 PM

President: T.B.M. Chowdhury,

Undergraduate STEM Majors' Association of K-12 Experiences with their STEM Identities

Remy Dou, Florida International University

Heidi Cian, Florida International University

Group Dynamics: Examining Group Member Roles in Small Group Data-Based Argumentation

Tasks in the context of a Large-Lecture Course

Andy Cavagnetto, Washington State University

Nyck Ledezma, Cal Poly Pomona

Archer Harrold, University of Nebraska

Anna Ferroggiaro, Washington State University

Brandon Call, Washington State University

Dana Roach, Washington State University

Lauren Duffy, Washington State University

Jessie Arneson, Washington State University

Erika Offerdahl, Washington State University

Jacob Woodbury, Washington State University

Teaching science while socially distanced: College science laboratory instructors' experiences with synchronous hybrid courses

Laura B. Schneider, St. Mary's College of Maryland; Great Mills High School

Perceiving data as inconsistent with expectations - an important factor for sense-making of experimental results

Burkhard Priemer, Humboldt Universität zu Berlin

Sophia Chroszczinsky, Humboldt Universität zu Berlin

Amy M Masnick, Hofstra University

3/28/22

Strand 2: Science Learning: Contexts, Characteristics and Interactions

Related Paper Set-Supporting Anti-Deficit Noticing and Equitable Science Teaching and Learning

11:00 AM-12:30 PM

Presenter: David P. Steele, Alder Graduate School of Education

Rearticulating Deficit Language Ideologies with Researchers and Teachers in Elementary Science Professional Development

Ashlyn Pierson, The Ohio State University

Bethany Daniel, Vanderbilt University

Sarah Jaewon Lee, Vanderbilt University

Andrea Wentworth Henrie, Vanderbilt University

Heather J. Johnson, Vanderbilt University

Danielle T. Keifert, University of North Texas

Noel Enyedy, Vanderbilt University

Secondary Pre-service Teachers Becomings: Fostering Anti-deficit Noticing Through Attending To Students' Sense-making Repertoires

David P. Steele, Alder Graduate School of Education

Sophia Jeong, The Ohio State University

Natasha Hillsman Johnson, University of Toledo

Use of Science and Engineering Practices to Create Equitable STEM Learning: Implication For Teachers' Anti-deficit Noticing

Meenakshi Sharma, sharma_m@mercer.edu

Community-based Research as Pedagogy for Strength-based Teacher Education

Adam Bell, University of Washington

Jeff Chandler, University of Washington

Gracie Merrett, University of Washington

Conditions Expanding Opportunities for Pre-service Teachers to Learn in Field Placements

Karin Lohwasser, University of California, Santa Barbara

Caroline Hadley Long, University of Washington

Soo-Yean Shim, University of Illinois

Mark Windschitl, University Of Washington

Tammy Q. Tasker, Western Washington University

3/28/22

Strand 3: Science Teaching — Primary School (Grades preK-6): Characteristics and Strategies

Symposium-International Collaborative Investigation of Third Grade Students' Understandings of Scientific Inquiry

11:00 AM-12:30 PM

International Collaborative Investigation of Third Grade Students' Understandings of Scientific Inquiry

Judith S. Lederman, Illinois Institute Of Technology

Selina L. Bartels, Valparaiso University

Juan P. Jimenez, Illinois Institute of Technology

3/28/22

Strand 4: Science Teaching — Middle and High School (Grades 5-12): Characteristics and Strategies

SC-organized paper set-Student motivation and creativity in secondary science

11:00 AM-12:30 PM

Presider: Wardell Anthony Powell, Framingham State University

A new way to promote creative thinking skills of students: Innovative science learning environments

Ferah Ozer, Bogazici University

Nihal Dogan, Bolu Abant Izzet Baysal University

Adolescents' Motivation and Self-Efficacy in Science Face-to-Face Learning Environments vs. in Distance Learning

Shira Passentin, Weizmann Institute of Science

David L. Fortus, Weizmann Institute Of Science

Variations in the Co-occurrence of Epistemic Agency and Collective Enterprise

Jessica L. Alzen, University of Colorado Boulder

Kelsey D. Edwards, Northwestern University

William R. Penuel, University of Colorado

Brian J. Reiser, Northwestern University

Cynthia Passmore, University of California-Davis

Chris D. Griesemer, University of California Davis

Aliza Zivic, Northwestern University

Christina M Murzynski, Northwestern University

Jason Buell, Northwestern University

3/28/22

Strand 6: Science Learning in Informal Contexts

SC-organized paper set-Evaluating informal learning interventions

11:00 AM-12:30 PM

Presenter: Miri I. Barak, Technion - Israel Institute Of Technology

Building Capacity for Collective Evaluation across ISE Centers: A Tested Model for a Collaborative Approach

K. C. Busch, North Carolina State University

Lynn Chesnut, North Carolina State University

Regina Ayala Chavez, North Carolina State University

Kathryn T. Stevenson, North Carolina State University

Lincoln Larson, North Carolina State University

Charles Yelton, North Carolina Museum of Natural Science

Examining Practices and Attitudes about the NSF's Broader Impacts Criterion: A Systematic Literature Review

Stephanie Teeter, NC State University

Spatial Drawing Ability: Informal Learning Experiences

Kimberly Ann Currens, Texas A&M University

Sandra B. Nite, Texas A&M University

Ali Bicer, University of Wyoming

Jihu Lee, Allen Academy

Lila Moseley, Texas State University

Rachael Jones, Texas A&M University

3/28/22

Strand 7: Pre-service Science Teacher Education

SC-organized paper set-Connecting science and society in teacher education

11:00 AM-12:30 PM

President: Pamela S. Lottero-Perdue, Towson University

ENACT Project: Promoting Pre-service Science Teachers' Perceptions on Social Responsibility of Scientists and Engineers (Virtual)

Yeonjoo Ko, Ewha Womans University

Hyunju Lee, Ewha Womans University

Jiyeon Hong, Ewha Womans University

Establishing a Community of Practice to Support Elementary Preservice Teachers' Socioscientific Issues-Focused Instruction

Melanie Kinskey, Sam Houston State University

Dana L. Zeidler, University Of South Florida

Exploring connections between anxiety and science understanding around Covid-19

Tina Vo, University of Nevada- Las Vegas

Margarita Huerta, University of Nevada- Las Vegas

Heather Dahl, University of Nevada- Las Vegas

Kenneth Varner, University of Nevada- Las Vegas

Preservice science teachers' competences in evidence-based practice – A longitudinal case study

Pascal Pollmeier, Paderborn University

Sabine Fechner, Paderborn University

3/28/22

Strand 8: In-service Science Teacher Education

SC-organized paper set-Tools and Techniques to Understand and Support Teacher Learning

11:00 AM-12:30 PM

President: Venkat Rao Vishnumolakala, Curtin University

It's the work that it does, not the object itself: Scientific posters as boundary objects

Shannon G. Davidson, Florida State University

Sherry A. Southerland, Florida State University

Lama Jaber, Florida State University

The types of feedback used by teacher educators in engineering design workshops and their effectiveness

Minyoung Gil, Pennsylvania State University

Matthew Johnson, Pennsylvania State University

Tools for Observing Productive Talk: A Comparison of Two Protocols (RTOP/IQA-SOR)

Patrick J. Enderle, Georgia State University

Claudia Hagan, Georgia State University

Sierra Lynn Morandi, Florida State University

Ryan Coker, Florida State University

Victor Kasper, Florida State University

Danielle M. Vande Zande, Florida State University

Jennifer Schellinger, FSU

Sherry A. Southerland, Florida State University

Using Argumentative Tasks to Promote Out of Field Physics Teachers' Professional Development

David Perl Nussbaum, Weizmann Institute of Science

Edit M. Yerushalmi, Weizmann Institute of Science

3/28/22

Strand 8: In-service Science Teacher Education

SC-organized paper set-The Role of Collaboration in Teacher Learning

11:00 AM-12:30 PM

President: Emmanuel Mushayikwa, University of the Witwatersrand

A Design-Based Research Methodology Utilizing Conjecture Mapping to Frame Embedded Co-design Cycles

Amanda N. Peel, Northwestern University

Jacob Kelter, Northwestern University

Lexie Zhao, Northwestern University

Michael Horn, Northwestern University

Uri Wilensky, Northwestern University

Experienced Teachers' Thinking about NGSS Classroom Assessment: Resources, Coherences with Instruction, and Shifts through Co-Design

Jennifer Richards, Northwestern University

Olivia D. Masse, Northwestern University

Kevin Cherbow, Florida State University

Miray Tekkumru Kisa, Florida State University

Investigating the Effectiveness of an Innovative Professional Development Program for Inquiry-based Secondary Science Education

Arne Bewersdorff, Technical University of Munich

Armin Baur, Heidelberg University of Education

Markus Emden, Zurich University of Teacher Education

Multimodal Analysis of Science Teachers' Facework During Collaborative Video-Based Learning (Virtual)

Adi Mendler, Ben-Gurion University of the Negev, Israel

Dana Vedder-Weiss, Ben-Gurion University Of the Negev, Israel

3/28/22

Strand 8: In-service Science Teacher Education

Related Paper Set-Centering Place-Based Education for Teaching Science Outdoors in Urban Contexts

11:00 AM-12:30 PM

Understanding Informal Science Educator Identity as Critical Leverage for Science Teaching & Learning Partnerships

Gail Richmond, Michigan State University

Roberta Hunter, Michigan State University

Eleanor Kenimer, Michigan State University

Cultural Historical Activity Theory (CHAT) as a lens for understanding challenges of developing successful formal/informal science education partnerships

Eleanor Kenimer, Michigan State University

Gail Richmond, Michigan State University

The power of virtual platforms to support teacher learning and community development for urban outdoor science teaching

Roberta Hunter, Michigan State University

Irene S. Bayer, Michigan State University

Gail Richmond, Michigan State University

The role of professional learning in the development of questioning

Kara Haas, Michigan State University

Tali Tal, Technion

Gail Richmond, Michigan State University

The role of context in supporting responsive place-based urban science teaching

Tali Tal, Technion

Gail Richmond, Michigan State University

Roberta Hunter, Rutgers University

3/28/22

Strand 10: Curriculum and Assessment

Related Paper Set-Teaching and Learning about COVID-19 in the Midst of the Pandemic

11:00 AM-12:30 PM

Justice-Centered STEM Education to Address Pressing Societal Challenges Using the Case of the COVID-19 Pandemic

Okhee Lee, New York University

Todd Campbell, University of Connecticut

Teacher Learning Through Collaborative Curriculum Design During the COVID-19 Pandemic

Troy D Sadler, University of North Carolina at Chapel Hill

Li Ke, University of North Carolina at Chapel Hill

Patricia J. Friedrichsen, University Of Missouri–Columbia

Rebecca Rawson,

Laura Zangori, University Of Missouri

COVID Connects Us: Tensions and Celebrations

Yang Zhang, University of Rochester

April Lynn Luehmann, University Of Rochester

Teaching Science During the COVID-19 Pandemic: A National Study of Teacher of Decision Making

Peggy J. Trygstad, Horizon Research, Inc.

Sean Smith, Horizon Research, Inc.

Understanding Minoritized Youth Learning through Social Networks during the COVID-19 Multi-pandemic

Angela Calabrese-Barton, University of Michigan

Francisco Parra, University of Michigan

Frankie Calabrese Barton, Youth Action Council

Grace Rose, Youth Action Council

Devon Riter, University of Michigan

Day W. Greenberg, University of Michigan

3/28/22

Strand 11: Cultural, Social, and Gender Issues

Symposium-Multiplying Perspectives on Racial Equity in STEM Education: Insights from Canada, Netherlands, and the USA.

11:00 AM-12:30 PM

Presider: Jennifer Adams, University Of Calgary

Multiplying Perspectives on Racial Equity in STEM Education: Insights from Canada, Netherlands, and the USA.

SARAH HALWANY, University of Calgary

Jennifer Adams, University Of Calgary

Terrell R. Morton, University of Missouri - Columbia

Tia C. Madkins, The University of Texas At Austin

Claire Paton,

Nadia Qureshi, University of Toronto

Theila Smith, University of Groningen

Shari Watkins, American University

Kevin Hewitt,

Maydianne Andrade,

3/28/22

Strand 11: Cultural, Social, and Gender Issues

SC-organized paper set-Critical Race Theory and Other Race Critical Approaches to STEM Education

11:00 AM-12:30 PM

President: Selene Y. Willis, University Of South Florida

A Critical View of STEM Curriculum from the LatCrit Perspective

Gianna Lopez-Colson, University of Texas Rio Grande Valley

Joe De Leon, University of Texas Rio Grande Valley

Roxana Jimenez, University of Texas Rio Grande Valley

Case Studies of Science Teachers' Experiences With a State Law Banning Critical Race Theory

Katherine Wade-Jaimes, University of Nevada

Rachel D. Askew, Vanderbilt University

Re-Constructing the "Black" Box and Making it Transparent for the Future of Science and Technology in Science Education: Towards Equitable, Social Justice Criticality

Noemi Waight, University at Buffalo

Shakhnoza Kayumova, University of Massachusetts-Dartmouth

Jennifer Tripp, University at Buffalo

Feyza Achilova,

Science Preservice Teachers' Views on Diversity and Race in the Science Classroom

Preethi Titu, Kennesaw State University

Seema Rivera, Clarkson University

3/28/22

Strand 13: History, Philosophy, Sociology, and Nature of Science
SC-organized paper set-NOS and Science Pedagogy and instruction

11:00 AM-12:30 PM

Presider: Hernan Cofre, Pontificia Universidad Católica de Valparaíso

Evaluation of Nature of Science Representations in Biology School Textbooks Using the Family Resemblance Approach (Virtual)

Kristina Fricke, Freie Universität Berlin

Bianca Reinisch, Freie Universität Berlin

Exploring the Articulation of Nature of Science Ideas in Turkish Middle School Science Textbooks

Beyza Okan, Bogazici University

Ebru Kaya, Bogazici University

Impacts of Professional Science Experience on Induction Science Teachers' NOS understandings, Pedagogy, and Science Identities

Emily C. Turner, Georgia State University

Robert D. Bennett, Georgia State University

Renee Schwartz, Georgia State University

Proposed Teacher Competencies to Support Effective Nature of Science Instruction: A Meta-Synthesis of the Literature

Noushin Nouri, University of Texas Rio Grande Valley

William F McComas, University Of Arkansas

3/28/22

Strand 14: Environmental Education and Sustainability

SC-organized paper set-Making sense of socioscientific issues

11:00 AM-12:30 PM

Presider: Sarah J. Carrier, North Carolina State University

Adjusting the Lens: Elementary Students Sharing and Learning about Climate Change through Photovoice

Imogen R Herrick, University of Southern California

Michael Lawson, Kansas State University

Ananya Matewos, St. Norbert College

Investigating Relationship(s) Between Epistemological Beliefs, Argument Quality and Informal Reasoning in the Context of SSI (Virtual)

Cansu Basak Uygun, Middle East Technical University

Ozgul Yilmaz-Tuzun, Middle East Technical University

Moral and ethical development through Socioscientific Holistic Perspectives (SSHP)

Eric Nolan

Pre-Service Secondary Science Teachers' Views on Teaching Socioscientific Issues

Jen-Yi Wu, National Taiwan Normal University

Ying-Shao Hsu, National Taiwan Normal University

Wen-Xin Zhang, National Taiwan Normal University

3/28/22

Multi-Strand

Virtual Session D

11:00 AM-12:30 PM

3D Printing with Preservice Teachers: Implementation, Effects, and Future Directions (Virtual)

Shannon L. Navy, Kent State University

Elena Novak, Kent State University

Visualizing STEM in Pakistan: Insights from a Professional Development for Conceptualizing

STEM (Virtual)

Tasneem Anwar, The Aga Khan University

An Investigation of Differences in Students' Interest in STEM Among NGSS and Non-NGSS

Implementation (Virtual)

Brienne May, Liberty University

Jillian L. Wendt, University of the District Of Columbia

Michelle Barthlow, Liberty University

Development of Students' Systems Thinking and Problem-solving through Authentic Aerosol
Science Research (Virtual)

Jeremy W Melton, National Sun Yat-sen University, Taiwan

Paichi-Pat Shein, National Sun Yat-sen University, Taiwan

Jepri A. Saiful, National Sun Yat-sen University, Taiwan

3/28/22

Strand 2: Science Learning: Contexts, Characteristics and Interactions

SC-organized paper set-Student Experiences in Science Teaching & Learning

2:45 PM-4:15 PM

President: Lynn D. Dierking, Oregon State University

"Do worms have urine?": Resources students draw upon in response to uncertainty in biology laboratories

Sam Skrob-Martin, Florida State University

Alicia Batailles,

Sherry A. Southerland, Florida State University

"Why aren't you listening to me?!: Community and Individual roles in students' epistemic agency in science

Jennifer Schellinger, FSU

Katarina Gomez, Florida State University

Lama Z Jaber, Florida State University

Sherry A Southerland, Florida State University

Using Making to Transform the Learning of Physics into a Personally Meaningful Experience

Tal Peer, Technion - Israel Institute of Technology

Shulamit Kapon, Technion - Israel Institute of Technology

Implementing Contextualized Science Curriculum and Instruction in Tanzania: The Practice and Possibilities

Winston E Massam, Assistant Professor - Aga Khan University (Institute for Educational Development, East Africa)

3/28/22

Strand 2: Science Learning: Contexts, Characteristics and Interactions

Related Paper Set-Equity and Justice in Engineering and Science: Centering Black and Latinx culture, language and Identity

2:45 PM-4:15 PM

Presenter: Okhee Lee, New York University

Equity and Justice in Engineering and Science: Centering Black and Latinx Culture, Language and Identity

Natalie S. King, Georgia State University

Zachary Collier, University of Delaware

Bridgette G. Johnson, University of Delaware

Melanie Acosta, Florida Atlantic University

Charisse N Southwell, Broward County Public Schools, Fort Lauderdale, Florida

Latinx Students' Sense of Familismo in Undergraduate Science and Engineering

Enrique Lopez, University of Colorado, Boulder

Vincent Basile, Colorado State University

Magnolia Landa-Posas, University of Colorado, Boulder

Kaylee Ortega, University of Colorado, Boulder

America Ramirez, University of Colorado, Boulder

Amplifying the Voices of Multicompetent students in STEM by Centering Justice and Audience Design in Engineering and Science

Greses Pérez, Tufts University

Okhee Lee, New York University

Becoming a Teacher of Engineering as a Racialized Local Contentious Practice (Virtual)

Christopher G. Wright, Drexel University

Rasheda Likely, Kennesaw State University

Mikhail Miller,

Neisha Young, Drexel University

Sinead Meehan, Drexel University

Fifth-Grade Engineering and Language, Culture, and Identity: Lessons Learned by Teacher and Researcher

Claudia Walker, Murphey Traditional Academy, Greensboro, NC

Heidi B. Carlone, Vanderbilt University

3/28/22

Strand 3: Science Teaching — Primary School (Grades preK-6): Characteristics and Strategies

SC-organized paper set-Strategies for Science and Engineering Education

2:45 PM-4:15 PM

President: Sarah J. Carrier, North Carolina State University

Elementary Teachers' Verbal Supports during an NGSS-Aligned Unit for Inclusive and General Class Contexts

Sarah C Lilly, University of Virginia

Anne M McAlister, University of Virginia

Jennifer L Chiu, University of Virginia

Elementary Science and Engineering Teaching Self-Efficacy: Trends in the Literature and a Research Framework (Virtual)

Jeanna R. Wieselmann, Southern Methodist University

Deepika Menon, University of Nebraska-Lincoln

Sarah A. Haines, Towson University

Sumreen Asim, Indiana University Southeast

Factors Associated with K-5 Science Teaching Time (Virtual)

Alison Brockhouse, Institute for School Partnership

Maia Elkana, Institute for School Partnership, Washington University in St. Louis

Rachel Ruggirello, Washington University in St. Louis

Teacher Educators and Elementary Teachers Share Goals for Authentic Science and Literacy Integration in the 20th Century Realities of 21st Century Classrooms

Sarah J. Carrier, North Carolina State University

Danielle R Scharen, North Carolina State University

3/28/22

Strand 5: College Science Teaching and Learning (Grades 13-20)

SC-organized paper set-Academic Pathways, Persistence, and Science Identity

2:45 PM-4:15 PM

President: Venkat Rao Vishnumolakala, Curtin University

Becoming a Scientist: Exploring How Critique Supports the Development of Undergraduate Students' Science Identity

Gabrielle Jablonski, Idaho State University

Anna S. Grinath, Idaho State University

Bridge/or Barrier? Institutional Agents Shape Sense of Belonging for First-Generation STEM Students Holding Intersecting Identities

Angela N. Google, University of South Alabama

Jeremiah Henning, University of South Alabama

Grace Sekaya, University of South Alabama

Zachery McMullen, University of South Alabama

Framework for chemistry course redesign to support first generation college student success

Roshni Bano, University of Illinois At Chicago

Minjung Ryu, University of Illinois At Chicago

Predictors of Community College Astronomy Performance

Zachary Richards, Suffolk County Community College and Stony Brook University

Angela M. Kelly, Stony Brook University

3/28/22

Strand 6: Science Learning in Informal Contexts

SC-organized paper set-*Informal learning as a family activity*

2:45 PM-4:15 PM

Presider: Susanna E. Hapgood, University of Toledo

Activity Design Principles that Support Family-Based Engineering Learning in Early Childhood

Scott A. Pattison, TERC

Gina N. Svarovsky, University Of Notre Dame

Smirla Ramos-Montañez, TERC

Catherine Wagner, University of Notre Dame

Amy Corbett, Metropolitan Family Service

Maria Perdomo, Metropolitan Family Service

Viviana López Burgos, Independent Consultant

Sabrina De Los Santos, TERC

Engaging children and caregivers in engineering design projects: Development of maker workshops and digital tools

Susan Letourneau, New York Hall of Science

David Wells, New York Hall of Science

Sonja Latimore, GBH

Mary Haggerty, GBH

Peter Ciavarella, New York Hall of Science

Lauren Vargas, New York Hall of Science

Daniel Kirk, New York Hall of Science

Lisa Ellsworth, GBH

Melissa Carlson, GBH

Louise Flannery, GBH

Intergenerational Family Learning in Conservation Science

Jonathan Simmons, University of Connecticut

Todd Campbell, University of Connecticut

David M. Moss, University of Connecticut

John Volin, University of Maine

Chester Arnold, University of Connecticut

Laura M Cisneros, University of Connecticut

Cary Chadwick, University of Connecticut

David Dickson, University of Connecticut

Nicole Freidenfelds, University of Connecticut

3/28/22

Strand 7: Pre-service Science Teacher Education

SC-organized paper set-The role of noticing in learning to teach science

2:45 PM-4:15 PM

Presider: Stefan Sorge, IPN - Leibniz Institute for Science and Mathematics Education, Kiel

Elementary Preservice Teachers' Noticing of Scientific Argumentation within Two Online Practice Spaces

Pamela S. Lottero-Perdue, Towson University

Heidi L. Masters, University Of Wisconsin-La Crosse

Jamie N. Mikeska, Educational Testing Service (ETS)

Meredith M. Thompson, MIT

Meredith Park Rogers, Indiana University

Dionne Cross Francis, University of North Carolina at Chapel Hill

Pre-service Teachers Notice Student Thinking. Then What?

Tara Barnhart, Chapman University

Miray Tekkumuru-Kisa, Florida State University

Heather J. Johnson, Vanderbilt University

Supporting Pre-Service Teachers' Attention to All Students' Ideas Using a Learning Progression Approach

Alicia C. Alonzo, Michigan State University

The impacts of content area on novice teacher noticing-a preliminary analysis

Lu Wang, Indiana University Kokomo

3/28/22

Strand 8: In-service Science Teacher Education

SC-organized paper set-Variations in STEM Teachers Changes through Professional Development

2:45 PM-4:15 PM

Presider: Xinying Yin, California State University-San Bernardino

Exploring The Sources of Science Teachers' Self-Efficacy

Jessica Gale, Georgia Institute Of Technology - CEISMC

Meltem Alemdar, Georgia Institute Of Technology

Christopher Cappelli, Georgia Institute Of Technology

Trajectories of Adoption and Abandonment After Professional Development in Project-Based Learning

Cesar Delgado, North Carolina State University

Kathryn Green, University of Georgia

Minnie Webster, North Carolina State University

Variable Take-up of Professional Development: How Activity Systems Influence Science Teachers' Enactment of Project-Based Learning

Tess Bernhard, University of Pennsylvania

Amy Guillotte, University of Pennsylvania

Sarah Kavanagh, University of Pennsylvania

Co-Designing to Understand Equity-Focus in Computational Thinking (CT) Integrated Science Curricula

Marissa A. Levy, Northwestern University

Amanda Peel, Northwestern University

Sugat Dabholkar,

Lexie Zhao, Northwestern University

Susan Juhl,

Lauren Levites,

Jacob Mills,

Sally Wu,

Michael Horn, Northwestern University

Uri Wilensky, Northwestern University

3/28/22

Strand 8: In-service Science Teacher Education

SC-organized paper set-Developing Teacher Leaders

2:45 PM-4:15 PM

President: Avraham Merzel, The Hebrew University of Jerusalem

Developing and Retaining Mid-Career Science Teachers through a Teacher Leadership Program

Andrea Reeder, Middle Tennessee State University

Fatma Kaya, Middle Tennessee State University

Weiqi Zhao, University of Cincinnati

Melody J Elrod, Middle Tennessee State University

Joshua Reid, Middle Tennessee State University

Greg T Rushton, Middle Tennessee State University

Brett Criswell, West Chester University

Exploring Boundary Spanning as a Theoretical Framework to Design for Science Teacher Leader Professional Learning

Sara C Heredia, The University of North Carolina Greensboro

Michelle Lea Phillips, Exploratorium

Ti'Era D. Worsley, University of North Carolina at Greensboro

Hadrian Pollard, University of North Carolina at Greensboro

Sarah Stallings, University of North Carolina at Greensboro

Julie Yu, Exploratorium

Impact of Teacher Leadership Skills and Adaptability during Educational Upheaval

Christine R. Lotter, University of South Carolina

Amanda Gonczy, Michigan Technological University

Knowledge, Practices, and Attributes of International Science Coordinators and the Resources They Draw Upon: Supporting Teachers During the COVID-19 Pandemic

Harleen Singh, Medaille College

Hatice Ozen_Tasmedir, University of Georgia

Yuxi Huang, University of Georgia

Hong H Tran, University of Georgia

Julie A Luft, University of Georgia

Brooke A Whitworth, Clemson University

3/28/22

Strand 10: Curriculum and Assessment

SC-organized paper set-Assessment for modeling and reasoning

2:45 PM-4:15 PM

Presider: Elizabeth X. De Los Santos, University of Nevada, Reno

Assessing Socio-scientific Systems Thinking for the COVID-19 Pandemic

Eric A Kirk, University of North Carolina at Chapel Hill

Troy Sadler, University of North Carolina at Chapel Hill

Li Ke, University of North Carolina at Chapel Hill

Laura Zangori, University Of Missouri

Exploring Student Reasoning Patterns in the Context of a NGSS-Aligned Assessment Task: The Harvestmen Item (Virtual)

Dante Cisterna, Educational Testing Service

Lei Liu, Educational Testing Service

Aoife Cahill, Educational Testing Service

Devon Kinsey, Educational Testing Service

Xianyang Chen, Educational Testing Service

Yi Qi, Educational Testing Service

Investigation on effect of spatial visualization on scientific modeling in primary and secondary school students (Virtual)

Jing Lin, Beijing Normal University

Letong Zhang, Beijing Normal University

Ping-Han Cheng, National Taiwan Normal University

Chun-Yen Chang, National Taiwan Normal University

Scaffolding Support for Student Modeling in Three Dimensional Assessment Tasks

Kate Henson, University of Colorado

Jason Buell, CU Boulder

3/28/22

Strand 11: Cultural, Social, and Gender Issues

SC-organized paper set-Cultural Approaches to the Teaching and Learning of Science

2:45 PM-4:15 PM

President: Heidi Cian, Florida International University

Improving the Achievement and Problem-solving Skills of Students: How Effective is CTCA in Nuclear Chemistry?

Ibukunolu A. Ademola, ACEITSE-Lagos State University
Peter A. Okebukola, ACEITSE-Lagos State University
Olasunkanmi A. Gbeleyi, ACEITSE-Lagos State University
Adekunle I. Oladejo, ACEITSE-Lagos State University
Franklin U. Onowugbeda, ACEITSE-Lagos State University
Deborah O. Agbanimu, ACEITSE-Lagos State University
Fred Awaah, University of Professional Studies Accra
Esther O. Peter, ACEITSE-Lagos State University
Stella I. Uhuegbu, ACEITSE-Lagos State University
Yetunde A. Mabadeje, ACEITSE-Lagos State University

Teacher Understanding of Funds of Knowledge in the High School Biology Classroom

Molly M. Staggs, University Of South Florida
Karl G. Jung, University Of South Florida
Julie C. Brown, University Of Florida

Underachievement in Difficult Concepts in Biology: Can CTCA be the Way Out?

Francisca A. Allename, ACEITSE- Lagos State University
Peter A. Okebukola, ACEITSE- Lagos State University
Deborah Oluwatosin Agbanimu, ACEITSE- Lagos State University
Franklin U. Onowugbeda, ACEITSE- Lagos State University
Esther Oluwafunmilayo Peter, ACEITSE- Lagos State University

3/28/22

Strand 12: Technology for Teaching, Learning, and Research

Related Paper Set-Learning Chemistry in Immersive Virtual Reality: A Spatial Analysis of Students' Collaborative Interactions

2:45 PM-4:15 PM

Discussant: Joseph Krajcik, Michigan State University, , ,

Presenter: Chin-Chung Tsai, National Taiwan Normal University

An Analytical Framework for Spatial Analysis of Students' Interactions in Immersive Virtual Reality

Mihye Won, Curtin University

Dewi Ungu, Curtin University

Henry Matovu, Curtin University

David F. Treagust, Curtin University

Chin-Chung Tsai, National Taiwan Normal University

Mauro Mocerino, Curtin University

Roy Tasker, Western Sydney University

Joseph S. Krajcik, Michigan State University

Students' Construction of Learning Activities to Understand the Formation of Snowflakes with Three Different Modes

Dewi Ungu, Curtin University

Mihye Won, Curtin University

Henry Matovu, Curtin University

David F. Treagust, Curtin University

Chin-Chung Tsai, National Taiwan Normal University

Mauro Mocerino, Curtin University

Roy Tasker, Western Sydney University

Comparative Analysis on the Impact of Scaffolding on Students' Interactions within Immersive Virtual Reality

David F. Treagust, Curtin University

Dewi Ungu, Curtin University

Mihye Won, Curtin University

Henry Matovu, Curtin University

Chin-Chung Tsai, National Taiwan Normal University

Mauro Mocerino,

Roy Tasker, Western Sydney University

Progression of Students' Interactions over Three Immersive Virtual Reality Learning Activities

Henry Matovu, Curtin University

Mihye Won, Curtin University

Dewi Ungu, Curtin University

David F. Treagust, Curtin University

Chin-Chung Tsai, National Taiwan Normal University
Mauro Mocerino, Curtin University
Roy Tasker, Western Sydney University

3/28/22

Strand 13: History, Philosophy, Sociology, and Nature of Science

SC-organized paper set-NOS and Undergraduate Education

2:45 PM-4:15 PM

President: Jacob Pleasants, University of Oklahoma

Comparing Undergraduates NOS Views in Traditional vs. Inquiry-Taught Science Course

Alex T. St. Louis,

Hayat Hokayam, Texas Christian University

Development and Validation of a Rubric to Qualify and Quantify Responses to the VNOS Questionnaire

Fouad Abd-El-Khalick, University of North Carolina at Chapel Hill

Ryan Summers, University of North Dakota

Jeanne Brunner, University of Massachusetts Amherst

Jeremy Belramino, University of Illinois - Urbana-Champaign

John Y. Myers, University of Illinois at Urbana-Champaign

Learning to Teach NOS: How do NOS instructional views develop during semester-long NOS course?

Jerrid W. Kruse, Drake University

Isaiah Kent-Schneider, Drake University

Sarah Voss, Drake University

University Biology Students' Sociocultural and NOS Associated Positions About Policymakers' and Scientists' COVID-19 Responses

Alex J Sobotka, Texas A&M University

Ben A Janney, Texas A&M University

Benjamin C Herman, Texas A&M University

Sarah V Poor, Texas A&M University

Aaron Kidd, Texas A&M University

Michael P. Clough, Texas A&M University

Asha Rao, Texas A&M University

3/28/22

Strand 14: Environmental Education and Sustainability

SC-organized paper set-Place, culture, and connection in environmental science education

2:45 PM-4:15 PM

President: Catherine Quinlan, Howard University

Are School Gardens Culturally Relevant? Forging Connections Between High School Students and the Community

Mariam Takkouch, Western University

Isha DeCoito, Western University

Exploring Sense of Place across Generations: A Case study of a Negev Bedouin Community

Wisam Sedawi, Ben Gurion University

Orit Ben Zvi Assaraf, Ben-Gurion University Of the Negev, Israel

Amane Alatamin, Ben-Gurion University Of the Negev, Israel

Understanding Middle School Students' Connectedness with Nature

Andrea Moeller, University of Vienna

Petra Bezeljak, University of Vienna

Gregor Torkar, University of Ljubljana, Slovenia

Using environmental chemistry to engage students in scientific thinking while affirming their cultural context

Jeffrey Spencer, University of Michigan at Ann Arbor

Danielle N Maxwell, University of Michigan at Ann Arbor

Kaare Sikuaq Erickson, Ikaa?un Engagement; Ukpea?vik Iñupiat Corporation

Daniel Wall, I?isa?vik College

Linda Nicholas-Figueroa, I?isa?vik College; University of Alaska - Fairbanks

Kerri Pratt, University of Michigan at Ann Arbor

Ginger Shultz, University of Michigan at Ann Arbor

3/28/22

Research Committee

Admin Symposium-Unifying Our Community through Science Education

2:45 PM-4:15 PM

Presider: Mary M. Atwater, University Of Georgia

Unifying Our Community through Science Education

Mary M. Atwater, University Of Georgia

Rona Robinson-Hill, Ball State University

Brittany Garvin-Hudson, University of Mary Washington

3/28/22

Admin Symposium-Graduate Student Forum

6:15 PM-7:20 PM

Graduate Student Forum

Theila Smith, University of Groningen

Inés Mosquera Bargiela, Universidade de Santiago de Compostela

Emily Turner, Georgia State University

Samantha Ringl, Alice Lloyd College

Ti'Era D. Worsley, University of North Carolina at Greensboro

Johan Tabora, University of Illinois at Chicago

3/29/22

International Committee

Admin Symposium-Socioscientific Argumentation in Science Education

7:30 AM – 8:45 AM

Socioscientific Argumentation in Science Education

Ute Harms, Leibniz Institute for Science and Mathematics Education (IPN)

Carola Garrecht, IPN - Leibniz Institute for Science and Mathematics Education

Maria Evagorou, University of Nicosia, Nicosia, Cyprus

Nina Christenson, Karlstad University

Susanne Walan, Department of Environmental and Life Sciences, Karlstad University, Karlstad, Sweden

Pablo Brocos, University of Santiago de Compostela

Maria Pilar Jiménez-Aleixandre, Department of Applied Didactics, Universidade de Santiago de Compostela, Santiago de Compostela, Spain

Hanno Michel, IPN Kiel

Dirk S. Gellermann, Leibniz Institute for Science and Mathematics Education (IPN)

Ute Harms, Leibniz Institute for Science and Mathematics Education (IPN)

3/29/22

Roundtable Discussions

Please note: These initial Roundtable groupings will be rearranged in a later program draft, but all will remain at the same day and time.

Strand 1: Science Learning: Development of student understanding

Roundtables-Science in Contexts

8:00 AM-9:00 AM

President: Gianna Lopez-Colson, University of Texas Rio Grande Valley

Experiencing the Emergence of Antibiotics Resistant Bacteria: Students' Understanding of the Nature of Evolution (Virtual)

Bat-Shahar Dorfman, Weizmann Institute of Science

Amir Mitchell, Program in Systems Biology, University of Massachusetts Medical School, Worcester, Massachusetts, United States of America, Program in Molecular Medicine, University of Massachusetts Medical School, Worcester, Massachusetts, United States of America

Orna Dahan, Department of Molecular Genetics, Weizmann Institute of Science, Rehovot, Israel

Anat Yarden, Weizmann Institute Of Science

Planning in Science-Integrated Engineering: Kindergartners' Incorporation of Ideas about Inertia in their Design Plans

Pamela S. Lottero-Perdue, Towson University

John Settlage, UConn

Strand 2: Science Learning: Contexts, Characteristics and Interactions

Roundtables-Strand 2 Round Table: Argumentation in Science Teaching & Learning I

8:00 AM-9:00 AM

President: Peter A. Okebukola, Lagos State University

Categorizing Classroom-based Argumentation in Elementary STEM Lessons: Applying Walton's Dialogue Theory

Anna Gillespie-Schneider, UGA

Lorraine Franco, University of Georgia

Barbara A. Crawford, University Of Georgia

Yuling Zhuang, University of Georgia

Jonathan Foster, University of Georgia

AnnaMarie Conner, University of Georgia

Challenge in Reasoning about Evolution Acceptance for Muslim Students: The Mechanism of Motivated Reasoning

Rahmi Q. Aini, Kangwon National University

Minsu Ha, Kangwon National University

Examining Science Engagement: Epistemic Operations and Agentic Practices During Argumentation

Vivian A Zohery, University of Maryland - College Park

Ananya Matewos, Saint Norbert College

Lauren Cabrera, Virginia Commonwealth University

Doug Lombardi, University of Maryland, College Park

Strand 2: Science Learning: Contexts, Characteristics and Interactions

Roundtables-Strand 2 Round Table: Mediating Learning Processes in Science Teaching & Learning

8:00 AM-9:00 AM

President: Tamar Ginzburg, Technion - Israel Institute of Technology

The Authoritative-to-Dialogic Spectrum of Facilitation Practices

Carina M Carlos, Tufts University

Vesal Dini, Tufts University

Ira Caspari, Tufts University

The impact of typography in learning materials of science textbook (Virtual)

Rosalie Heinen, University of Münster

Susanne M. Heinicke, University of Münster

Using student-created core idea maps to promote meaningful learning in science

Helen Semilariski, Doctoral student

Regina Soobard, Research Fellow of Science Education

Miia Rannikmae, Professor

Strand 2: Science Learning: Contexts, Characteristics and Interactions

Roundtables-Strand 2 Roundtable: Argumentation in Science Teaching & Learning II

8:00 AM-9:00 AM

Presider: Sufen Chen, National Taiwan University Of Science and Technology

Describing changes in Student thinking about evolution in response to inquiry and argumentation-based instruction

Hernan Cofre, Pontificia Universidad Católica de Valparaíso

Francisca Carmona, Pontificia Universidad Católica de Valparaíso

Diego Canales, Pontificia Universidad Católica de Valparaíso

Paola Nuñez, Pontificia Universidad Católica de Valparaíso

Antonia Larrain, Alberto Hurtado University

Claudia Vergara, Alberto Hurtado University

Examining Relevant Evidence Construction as Actor-Network in the Collective Argumentation (Virtual)

Weiwei He, East China Normal University

Sihan Xiao, East China Normal University

Massive Dependence of Science students' answers about Relativity upon the Formulation of the question

Estelle Blanquet, University of Bordeaux

Eric Picholle, CNRS & Université Côte d'Azur

Strand 3: Science Teaching — Primary School (Grades preK-6): Characteristics and Strategies

Roundtables-Instructional methods for supporting students' science understanding

8:00 AM-9:00 AM

President: Alison Mercier, University of Wyoming

Revisiting elementary school students' images of scientists (Virtual)

Jing Lin, Beijing Normal University

Wenting Wei, Beijing Normal University

Ting Yuan, Beijing Normal University

The Impact of Arts-based Science Instruction on Emerging Multilingual Students' Achievement in Elementary Science

Sage Andersen, University of Texas At Austin

Brad Hughes, University Of California, Irvine

Strand 4: Science Teaching — Middle and High School (Grades 5-12): Characteristics and Strategies

Roundtables-Collaboration and science learning in middle grades

8:00 AM-9:00 AM

President: Michael Cassidy, TERC

"What if we explore..." Using Mountain Rescue to Promote Engaged Learning and Collaboration

Denise M. Bressler, East Carolina University

Shane Tutwiler, University of Rhode Island

Amanda Siebert-Evenstone, University of Wisconsin - Madison

Len Annetta, East Carolina University

Jason A. Chen, The College of William & Mary

Developing Scientifically Literate Citizenship: Self-Efficacy Beliefs of an Interdisciplinary Community of Practice

Mandi Collins, University of Nevada, Reno

Elizabeth X. De Los Santos, University of Nevada, Reno

Robert J Quinn, University of Nevada, Reno

Science Teachers' Views on the Integration of Science and Language for Emergent Bilinguals in Sixth-grade Classrooms

Sissy S. Wong, University of Houston

Jie Zhang, University of Houston

Araceli Enriquez-Andrade, University of Houston

Ma Glenda Wui, Ateneo de Manila University

The Effect of Teacher Participation in Multimedia Professional Development on Science Achievement Among Middle-School Students (Virtual)

Victoria J. VanUitert, University of Virginia

Michael J. Kennedy, University of Virginia

Lindsay M. Carlisle, University of Virginia

Strand 5: College Science Teaching and Learning (Grades 13-20)

Roundtables-Becoming Scientists: Students' Scientific Practices and Sense of Belonging

8:00 AM-9:00 AM

President: Hadeel Omar Edrees Dabbah, Ben-Gurion University of the Negev

An Interdisciplinary Approach to Develop Interest for Bioproduct Careers with Historically Underrepresented STEM Undergraduates (Virtual)

Shana L. McAlexander, Duke University

Katherine McCance, North Carolina State University

Margaret R. Blanchard, NC State University

Richard Venditti, NC State University

Building Inclusive Excellence in Undergraduate Science Education through Faculty Learning Communities: A Study of Five Cohorts

Marcelle Siegel, University Of Missouri–Columbia

Yejun Bae,

Terrell Morton,

Courtney Ngai,

Mojtaba Khajeloo,

Swarna Mahapatra,

Ritesh Sharma,

Charles Nilon,

Johannes Schul,

College Students' Sense of Belonging in the STEM Learning Ecosystem: Classroom, Department, and University Culture (Virtual)

Yejun Bae, Carolina University

Marcelle Siegel, University Of Missouri–Columbia

Mojtaba Khajeloo, University Of Missouri

Terrell R. Morton, University of Missouri - Columbia

Charles Nilon, University of Missouri-Columbia

Johannes Schul, University of Missouri-Columbia

Hyejin Shim, University of Missouri-Columbia

Effect of Demographic Factors on the Understanding of Concepts of Evidence: A Mixed Methods Study

Elizabeth Vergis, St. Mary's University, Calgary

Fostering Undergraduate STEM Students' and Teachers' Systems Thinking and Modeling Skills via a Food-Related Mini-Course

Roe Peretz, Technion—Israel Institute of Technology, Haifa 3200003, Israel

Marina Tal, Technion—Israel Institute of Technology, Haifa 3200003, Israel

Effrat Akiri, Technion—Israel Institute of Technology, Haifa 3200003, Israel

Yehudit Judy Dori, Technion—Israel Institute of Technology, Haifa 3200003, Israel

Dov Dori, Technion—Israel Institute of Technology, Haifa 3200003, Israel

Strand 6: Science Learning in Informal Contexts

Roundtables-Strand 6 Roundtable

8:00 AM-9:00 AM

Presider: Lynne Zummo, University of Utah

Decisions for Our Future: Learning through Collaborative Civic Decision-Making in a Digital Climate Simulation

Lynne Zummo, University of Utah

Strand 7: Pre-service Science Teacher Education

Roundtables-Strand 7 Roundtable

8:00 AM-9:00 AM

Computational Thinking Integration in STEM Pedagogy by Teacher Candidates (Virtual)

Heather F. Clark, UCLA

Imelda L. Nava, UCLA

Leticia Perez, UCLA

Jaleel Howard, UCLA

Investigating Pre-Service Teachers' Noticing of the Cultural Foundations of Children's Scientific Explanations

Alison Mercier, University of Wyoming

Tierney Hinman, Auburn University

Preparing and Retaining Race-Conscious Science Teachers Through Race, Culture, & Coffee

Stefanie L. Marshall, University of Minnesota- Twin Cities

Jenny Sarah Tilsen, University of Minnesota- Twin Cities

Jessica Forrester, University of Minnesota- Twin Cities

What Does an Undergraduate Research Experience Look Like in STEM Education?

Jennifer A. Wilhelm, University of Kentucky

Molly Fisher, University of Kentucky

Strand 11: Cultural, Social, and Gender Issues

Roundtables-Strand 11: Fostering Inclusion through STEM Leadership, Teaching, and Learning

8:00 AM-9:00 AM

Presenter: Uchenna Emenaha, The University of Texas At San Antonio,

"It's really important to me for kids to get interested in and become aware of the options that are available to them in the STEM": Culturally Responsive School Leadership

Noemi Waight, University at Buffalo

Jennifer Tripp, University at Buffalo

Lorenda Chisolm, Schenectady City School District

Community driven and relational STEM Teacher Leadership: Perceptions of Indigenous Female Teachers

Bhaskar Upadhyay, University of Minnesota

Kamal P Koirala, Tribhuban University, Gorkha Campus, Gorkha, Nepal

Generating an operational framework of gender and sexual diversity (GSD)-inclusive STEM teaching: A systematic literature review

Gary W. Wright, North Carolina State University

Impact of STEM Professionals Engaging with Students in Title One Schools

Sarah K. Guffey, University of South Alabama

Andrea C. Burrows, University Of Wyoming

Andria Schwartz, Quinsigamond Community College

Strand 11: Cultural, Social, and Gender Issues

Roundtables-Strand 11: Structural, Cultural, and Social Factors that Influence Student's STEM Identity and Engagement

8:00 AM-9:00 AM

President: Kathleen Schenkel, University of Michigan

Employing the Stereotype Content Model's Dimensions of Warmth and Competence to Identify and Categorize the Portrayal of Scientists in Meme-Based GIFs

Richard Velasco, University of Iowa

Yujiro Fujiwara, Texas Tech University

Lee Kenneth Jones, Asia-Pacific International School

Rebecca Hite, Texas Tech University

Examining the STEM career interest of juvenile justice youth using the Social Cognitive Career Theory.

Ally Hunter, University of Massachusetts, Amherst

Heather Griller Clark, Arizona State University

Michael Krezmien, University of Massachusetts, Amherst

Sarup Mathur, Arizona State University

Craig Wells, University of Massachusetts, Amherst

How to Broaden Participation in STEM by Indigenous Islanders

Jon Boxerman, WestEd

Sharon Nelson-Barber, WestEd

Kimberly Nguyen, WestEd

Micro-aggression and impostor phenomenon among racial/ethnic minorities in STEM (Virtual)

Devasmita Chakraverty, Indian Institute of Management Ahmedabad

Strand 12: Technology for Teaching, Learning, and Research

Roundtables-Using a simulated classroom to prepare elementary preservice teachers during and after the pandemic

8:00 AM-9:00 AM

Presider: Noemi Waight, University at Buffalo

Using a Simulated Classroom to Prepare Elementary Preservice Teachers During and After the Pandemic

Jamie N. Mikeska, Educational Testing Service (ETS)

Heather Howell, ETS

Devon Kinsey, ETS

Strand 14: Environmental Education and Sustainability

Roundtables-Strand 14 Roundtable

8:00 AM-9:00 AM

President: Lynne Zummo, University of Utah

Empirical research on school garden-based learning: A systematic review of the literature

Kathy Cabe Trundle, Utah State University

Rita Hagevik, The University of North Carolina At Pembroke

Incorporation of a Utility-Value Intervention into a Place-Based, Culturally Sustaining General Education Science Course

Michele L. Guannel, University of the Virgin Islands

Olivia Diana, University of the Virgin Islands

Angelisa Freeman, University of the Virgin Islands

Longitudinal effects of nature experiences on middle school students' environmental attitudes, interest and knowledge

Petra Bezeljak, Austrian Educational Competence Center for Biology, University of Vienna

Anna-Lena Neurohr, Austrian Educational Competence Center for Biology, University of Vienna

Andrea Möller, Austrian Educational Competence Center for Biology, University of Vienna

Places of Learning: Case studies on selected learning environments during COVID

David B. Zandvliet, Simon Fraser University

3/29/22

Strand 2: Science Learning: Contexts, Characteristics and Interactions

SC-organized paper set-Technology & Computer Science

9:00 AM-10:30 AM

President: Ruveyde Asli Kaya, Florida State University

Exploring the Potency of Culturo-Techno-Contextual Approach on Achievement of Secondary School Students in Computer Networking

Esther O. Peter, ACEITSE-Lagos State University

Peter A. Okebukola, ACEITSE-Lagos State University

David G. Peter, Lagos State University

Deborah O. Agbanimu, ACEITSE-Lagos State University

Fred A. Awaah, University of Professional Studies, Accra

Franklin U. Onowugbeda, ACEITSE-Lagos State University

Olasunkanmi A. Gbeleyi, ACEITSE- Lagos State University

Adekunle I Oladejo, ACEITSE-Lagos State University

Ibukunolu A. Ademola, ACEITSE-Lagos State University

Imole Samson, Lagos State University

Flowchart and Algorithm as Difficult Concepts in Computer Studies: Can CTCA Come to the Rescue?

Deborah Oluwatosin Agbanimu, ACEITSE-Lagos State University

Peter A. Okebukola, ACEITSE-Lagos State University

Franklin U. Onowugbeda, ACEITSE-Lagos State University

Esther Oluwafunmilayo Peter, ACEITSE-Lagos State University

Adekunle Ibrahim Oladejo, ACEITSE-Lagos State University

Fred Awaah, University of Professional Studies Accra

Ibukunolu Adebisi Ademola, ACEITSE-Lagos State University

Olasunkanmi Adio Gbeleyi, ACEITSE-Lagos State University

Francisca Ayobami Allename, Lagos State University, Nigeria

Student perceptions of computational thinking practices in a CT-integrated environmental science unit (Virtual)

Lexie Zhao, Northwestern University

Amanda N. Peel, Northwestern University

Michael Horn, Northwestern University

Uri Wilensky, Northwestern University

Will the Culturo-Techno-Contextual Approach Help Students' Understanding of Difficult Concepts in Computer Studies?

Daniel Ayomide Solarin, ACEITSE-Lagos State University

Peter A. Okebukola, ACEITSE-Lagos State University

Fred Awaah, ACEITSE-Lagos State University

Gamification: Toward the enhancement of self-efficacy in an introductory undergraduate biology laboratory course

David C. Owens, Georgia Southern University

Antonio P. Gutierrez de Blume, Georgia Southern University

Charles B. Hodges, Georgia Southern University

Kim Miles, Georgia Southern University

Cindi Smith-Walters, Middle Tennessee State University

Angela T. Barlow, University of Central Arkansas

3/29/22

Strand 2: Science Learning: Contexts, Characteristics and Interactions

Related Paper Set-Supporting Teachers to Develop Expansive Learning Environments in Science and Engineering

9:00 AM-10:30 AM

Discussant: Déana Scipio, IslandWood

Toward More Expansive Science Learning for Pre-Service Teachers

Jessica Watkins, Vanderbilt University

Natalie A De Lucca, Vanderbilt University

Centering Racialized Disciplinary Becoming in the Design of Teacher Professional Learning Communities (Virtual)

Christopher G. Wright, Drexel University

Rasheda Likely, Kennesaw State University

Sinead Meehan, Drexel University

Neissha Young, Drexel University

Mikhail Miller, Drexel University

Expanding Science Teacher Learning through Critical Relationality

Eli Tucker-Raymond, Boston University

Maria C. Olivares, Boston University

Brian Gravel, Tufts University

Amon Millner, Olin College of Engineering

Donna Peruzzi, Cambridge Public Schools

Exploring the “Wobbliness” of Teacher Candidates’ Deficit and Anti-Deficit Framing

Kirsten K. Mawyer, University of Hawaii

Heather J. Johnson, Vanderbilt University

Elementary Science Teachers’ Use of Representations to

Sarah Jaewon Lee, Vanderbilt University

Ashlyn Pierson, The Ohio State University

Danielle T. Keifert,

Andrea Wentworth Henrie, Vanderbilt University

Heather J. Johnson, Vanderbilt University

Déana A. Scipio, IslandWood

3/29/22

Strand 4: Science Teaching — Middle and High School (Grades 5-12): Characteristics and Strategies

SC-organized paper set-Coherent learning in NGSS curriculum and classrooms

9:00 AM-10:30 AM

Presenter: Elizabeth X. De Los Santos, University of Nevada, Reno

Assessing Coherence Understanding of Energy as a Crosscutting Concept

Avraham Merzel, The Hebrew University of Jerusalem

Yaron Lehavi, The David Yellin College of Education

Examining Teachers' Attempts to Support Student Motivation in Middle Grades NGSS Classrooms

Katy Nilsen, WestEd

Christopher J. Harris, WestEd

David McKinney, University of Nevada, Las Vegas

Gwen Marchand, University of Nevada, Las Vegas

Influences on NGSS Instruction: Curriculum, Professional Learning, and District Support

Melissa Rego, WestEd

Ashley Iveland, WestEd

Charlie Mahoney, WestEd

Robert F. Murphy,

Christopher J. Harris, WestEd

Responsive instructional design for students' coherence-seeking: Documenting episodes of principled improvisation in storyline enactment

Kevin Cherbow, Florida State University

3/29/22

Strand 5: College Science Teaching and Learning (Grades 13-20)

SC-organized paper set-Inclusive Pedagogy and Student Success

9:00 AM-10:30 AM

President: Tammy M. Long, Michigan State University

Case Study Pedagogy as Inclusive Pedagogy: Entry Points for STEM Faculty to Build Inclusive Classrooms

Ally Hunter, University of Massachusetts, Amherst

Melissa Zwick, Stockton University

Did COVID-19 & Distance Learning Heighten Performance Disparities in General Chemistry? (Virtual)

Ted M. Clark, The Ohio State University

Glenn A Clark, Whirlpool Corporation

Examining Science Teacher Educators' Perspectives of Inclusion

Karen C. Goodnough, Memorial University

Saiqa Azam, Memorial University

Todd Milford, University of Victoria

Christine D. Tippett, University Of Ottawa

When Disaster Strikes: How New Majority Students Navigate STEM During a Global Disruption

Terrell R. Morton, University of Missouri - Columbia

Yejun Bae, University of Missouri

Courtney Ngai, University of Missouri-Columbia

Marcelle Siegel, University Of Missouri–Columbia

Charles Nilon, University of Missouri-Columbia

Ritesh Sharma, University of Missouri-Columbia

3/29/22

Strand 6: Science Learning in Informal Contexts

SC-organized paper set-Informal learning centers - Transition during crisis

9:00 AM-10:30 AM

President: Jean-Philippe Ayotte-Beaudet, Université De Sherbrooke

An adaptive design of a remote SEM authentic outreach activity

Ella Yonai, Weizmann institute of science

Ron Blonder, The Weizmann Institute Of Science

Online Learning in Museums One Year after COVID-19 Closures

Megan Ennes, University of Florida

Amanda Wagner-Pelkey, University of Florida

Perpetuation of privilege: Impacts of low pay on workforce equity and diversity in informal education

Kathryn Rende, North Carolina State University

M. Gail Jones, North Carolina State University

Megan Ennes, University of Florida

3/29/22

Strand 7: Pre-service Science Teacher Education

SC-organized paper set-Developing science teacher practices

9:00 AM-10:30 AM

President: Bridget K. Mulvey, Kent State University

Deep structures of student lesson plans at the end of the university teacher education

Tanja Mutschler, University of Potsdam

David Buschhüter, University of Potsdam

Andreas Borowski, University of Potsdam

How Preservice Secondary Science Teachers Support Sensemaking and Discourse Across Disciplines

Valerie Meier, University Of California - Santa Barbara

John Galisky, University Of California - Santa Barbara

Matthew D. Bennett, University Of California - Santa Barbara

Julie A. Bianchini, University Of California - Santa Barbara

Identifying the seeds of productive science discourse in undergraduate courses for pre-service science teachers

Hadeel Omar Edrees Dabbah, Ben-Gurion University of the Negev

Orit Ben Zvi Assaraf, Ben-Gurion University of the Negev

Ahmad Basheer, Academic Arab College for Education in Israel – Haifa

Naji Kortam, Academic Arab College for Education in Israel – Haifa

Planning vs. Instruction: Analysis of Preservice Secondary Science Teachers' Use of Practices and Crosscutting Concepts

John Galisky, University of California, Santa Barbara

Matthew D. Bennett, UCSB

Julie A. Bianchini, University Of California - Santa Barbara

Sarah Hough, University of California, Santa Barbara

Meghan Macias, University of California, Santa Barbara

3/29/22

Strand 8: In-service Science Teacher Education

SC-organized paper set-Teacher Learning across Science Disciplines

9:00 AM-10:30 AM

President: Elizabeth B. Lewis, University Of Nebraska–Lincoln

A Physics Case Study for Why Teachers Feel In- or Out-of-Field: Looking Beyond Educational Background

Kyla Smith, University of Oxford

Judith Hillier, University of Oxford

Sibel Erduran, University of Oxford

Biology Teachers' Knowledge Considerations and Pedagogical Goals When Designing Dataset Driven Instruction Units

Carmel Bar, Weizmann Institute of Science

Bat-Shahar Dorfman, Weizmann Institute of Science

Anat Yarden, Weizmann Institute Of Science

Capturing Collective Pedagogical Content Knowledge (cPCK) of Evolution for understand how biology teachers develop their personal PCKevo

Claudia Vergara, Alberto Hurtado University

Arlette Bassaber, Pontificia Universidad Catolica de Valparaiso

Paola Nuñez, Pontificia Universidad Catolica de Valparaiso

Beatriz Becerra, Pontificia Universidad Católica de Valparaiso

Harold Hurtado, pontificia Universidad Católica de Valparaíso

David Santibanez, Universidad Finis Terrae

Hernan Cofre, Pontificia Universidad Católica de Valparaíso

Chemistry Teacher Retention, Migration, and Attrition

Martin F Palermo, Stony Brook University

Angela M. Kelly, Stony Brook University

Robert Krakehl, Stony Brook University

3/29/22

Strand 8: In-service Science Teacher Education

SC-organized paper set-Exploring Elements of Elementary Science Teaching

9:00 AM-10:30 AM

Presider: Jennifer Maguire, Virginia Tech

Academic Impact for Preschoolers and Kindergarteners of Classroom and Family Science: A Randomized, Control-Group Study

Susanna E. Hapgood, University of Toledo

Joan Kaderavek, University Of Toledo

Peter Paprzycki, University Of Southern Mississippi

Charlene M. Czerniak, University Of Toledo

Scott Molitor, University Of Toledo

Grant Wilson, The University of Toledo

Jeanna Heuring, Keene State College

Elementary teachers' understandings of student cognitive engagement in science through witnessing models of classroom instruction

Patricia S. Bills, Oakland University

Imogen Herrick, University of Southern California

Pathways to Critical Practice in Elementary Science Education

Emily Rose Seeber, University of Michigan

Christa Haverly, Northwestern University

Reconsidering Touch in an Elementary Science Sensemaking Space

Michelle N Brown, Pennsylvania State University

3/29/22

Strand 10: Curriculum and Assessment

SC-organized paper set-Curriculum and assessment for science learning

9:00 AM-10:30 AM

President: Catherine Mary Kenyon, Clemson University

Cells in Context: Comparing Online vs. In-person Delivery

Dina Drits-Esser, Genetic Science Learning Center - University of Utah

Ann E Lambert, Genetic Science Learning Center - University of Utah

Jen C Taylor, Genetic Science Learning Center - University of Utah

Molly Malone, Genetic Science Learning Center - University of Utah

Sheila A Homburger, Genetic Science Learning Center - University of Utah

Kristin E Fenker, Genetic Science Learning Center - University of Utah

Louisa A Stark, Genetic Science Learning Center - University of Utah

Designing Biomimetic Robots: Examining Middle School Students' Knowledge in an Interdisciplinary Environment

Michael Cassidy, TERC

Debra Bernstein, TERC

Gillian Puttick, TERC

Fayette Shaw, Tufts University

Kristen Wendell, Tufts University

Ethan Danahy, Tufts University

Students' Science Learning Interests and Formal Biology Curriculum Emphases: Special Reference to Viruses in the COVID Pandemic Era

Vivien M. Chabalengula, University Of Virginia

Ian Nicolaides, Southern Illinois University

Three-Dimensional Learning Progression for Supporting Students' Knowledge-in-use Proficiency in High School Project-based Learning Chemistry Curriculum

Peng He, Michigan State University

I-Chien Chen, Michigan State University

Joseph S. Krajcik, Michigan State University

3/29/22

Strand 11: Cultural, Social, and Gender Issues

SC-organized paper set-Cultural Relevance in Science & STEM

9:00 AM-10:30 AM

President: Greses Pérez, Tufts University

A Select Physics Teachers Use of Empathy While Engaging in Culturally Relevant Practices

Clausell Mathis, University of Washington

Sherry A. Southerland, Florida State University

An exploration of Chinese Secondary Chemistry Teachers' Conceptions of Culturally Relevant Science Teaching

Xinying Yin, California State University-San Bernardino

Black women science teachers and anti-racist teaching: An argument for Historically Relevant Science Pedagogy

Alexis Riley, Teacher's College -Columbia University

Felicia Moore Mensah, Teachers College, Columbia University

Cultivating culturally sustaining STEM classrooms: A narrative inquiry case study of a science teacher

Khanh Q. Tran, Purdue University, West Lafayette

Selcen Guzey, Purdue University

3/29/22

Strand 12: Technology for Teaching, Learning, and Research

SC-organized paper set-Digital Multimedia and Computational Thinking to Support Science Learning and Teaching

9:00 AM-10:30 AM

Presider: Peter Wulff, University of Potsdam

Integrating Computational Thinking and Engineering Practices to Teach STEM: Examining Students' Attitudes About Physical Computing

Tyler S. Love, The Pennsylvania State University, Harrisburg

Julpa Rajyaguru, The Pennsylvania State University, Harrisburg

Integrating Computational Thinking as Part of Simulation-based Scientific Investigations with Volcanic Hazards and Risk

Christopher Lore, Concord Consortium

Hee-Sun Lee, The Concord Consortium

Amy Pallant, The Concord Consortium

Sensemaking Through Computational Thinking: Images of Computing as a Scientific Epistemic Practice in Teacher Learning

Gozde Tosun, Penn State University

Amy V. Farris, Penn State

Teaching digital multimedia design with eye-tracking – exploring a new teaching approach for student teachers (Virtual)

Axel Langner, Institute of Chemistry Education, Justus-Liebig-University Giessen, Germany

Nicole Graulich, Justus-Liebig Universität Giessen

3/29/22

Strand 13: History, Philosophy, Sociology, and Nature of Science

SC-organized paper set-Nature of Science and Higher Education

9:00 AM-10:30 AM

President: Alison Cullinane, University of Oxford

How Teachers Used the Covid-19 Pandemic to Teach How Science Works

Jeanne L Brunner, University of Massachusetts Amherst

Ryan Summers, University of North Dakota

Learning about the Nature of Knowledge - lessons in teacher education

Alison Cullinane, University of Oxford, Department of Education

Abismrita Ahakravarty, Department of Education, University of Oxford

Olga Ioannidou, Department of Education, University of Oxford

Learning in trajectories of participation: Nature of Science and Temporality in the Nature of Scientists

Ashwin Krishnan Mohan, Pennsylvania State University

Gregory J. Kelly, Pennsylvania State University

Re-thinking Science Education Using Non-linear Theories: Implications of Posthumanism on Ethics, Policy, and Practice

Sophia Jeong, The Ohio State University

Kathryn M. Bateman, Temple University

David P. Steele, Alder Graduate School of Education

Brandon Sherman, IUPUI

3/29/22

Strand 15: Policy, Reform, and Program Evaluation

Related Paper Set-Explorations of K-12 Integrated STEM Teaching

9:00 AM-10:30 AM

Discussant: Erin Peters-Burton, George Mason University

The Current State of Integrated STEM Education: Comparing Science Content Areas and Grade-Levels (Virtual)

Emily A. Dare, Florida International University
Joshua A. Ellis, Florida International University
Gillian Roehrig, University of Minnesota
Elizabeth A. Ring-Whalen, St. Catherine University
Erin E. Peters-Burton, George Mason University

Understanding the Relationship between Context and Content Integration

Benny Mart Hiwatig, University of Minnesota Twin Cities
Joshua A. Ellis, Florida International University
Farah Faruqi, University of Minnesota Twin Cities
Khomson Keratithamkul, University of Minnesota Twin Cities
Elizabeth Forde, Florida International University
Gillian Roehrig, University of Minnesota
Erin E. Peters-Burton, George Mason University

Manifestations of Integration in Practice: A Case Study of Three Elementary Teachers' Integration of Engineering and Science

Farah Faruqi, University of Minnesota Twin Cities
Khomson Keratithamkul, University of Minnesota Twin Cities
Gillian Roehrig, University of Minnesota
Erin E. Peters-Burton, George Mason University

Yes, Math is There, but ...: Examining Mathematical Content in Integrated STEM

Elizabeth Forde, Florida International University
Latanya Robinson, Florida International University
Joshua A. Ellis, Florida International University
Emily A. Dare, Florida International University
Erin E. Peters-Burton, George Mason University

3/29/22

Publications Advisory Committee

Admin Symposium-NARST/NSTA Annual Research Worth Reading Recognition

9:00 AM-10:30 AM

Shakhnoza Kayumova, University of Massachusetts-Dartmouth

Dante Cisterna, Educational Testing Service

Allison Antink-Meyer, Illinois State University

G. Michael Bowen, Mount Saint Vincent University, Halifax, Nova Scotia, Canada

Cynthia Crockett, Harvard-Smithsonian Center for Astrophysics

Knut Neumann, IPN–Leibniz Institute for Science and Mathematics Education, Kiel, Germany

Join us in congratulating this year's recipients of the NSTA Annual Research Worth Reading award. This award is given to three research groups whose 2018 JRST articles inspire excellent teaching innovations.

This year's recipients are:

Harris, E. M., & Ballard, H. L. (2021). Examining student environmental science agency across school science contexts. *Journal of Research in Science Teaching*, 58(6), 906–934.

Puntambekar, S., Gnesdilow, D., Dornfeld Tissenbaum, C., Narayanan, N. H., & Rebello, N. S. (2021). Supporting middle school students' science talk: A comparison of physical and virtual labs. *Journal of Research in Science Teaching*, 58(3), 392–419.

Donovan, B. M., Weindling, M., Salazar, B., Duncan, A., Stuhlsatz, M., & Keck, P. (2021). Genomics literacy matters: Supporting the development of genomics literacy through genetics education could reduce the prevalence of genetic essentialism. *Journal of Research in Science Teaching*, 58(4), 520–550.

3/29/22

Multi-Strand

Virtual Session E

9:00 AM-10:30 AM

"I'm too slow to get through Statistics": The Relationship between Statistics Anxiety and Academic Dishonesty (Virtual)

Pnina Steinberger, Orot Israel College of Education
Yovav Eshet, Zefat Academic College
Keren Grinautsky, Western Galilee College

The Importance of Family-level Variables to Evolution-related Perspectives and Careers in Black Undergraduates (Virtual)

Ross H. Nehm, Stony Brook University
Gena C. Sbeglia, Stony Brook University

What science teachers' autobiographies tell us about their own science education and career choices (Virtual)

Mariana Luzuriaga, University of San Andrés
Maria Eugenia Podesta, University of San Andrés
Melina Furman, University of San Andrés

Science Classrooms as Hostile Environments for Black Female Science Teachers (Virtual)
Olayinka Mohorn, Dominican University

3/29/22

Strand 1: Science Learning: Development of student understanding

Poster-Strand 1 Poster Session

10:45 AM-12:00 PM

Examining the crosscutting concept of patterns: An initial construct map in the context of ecosystems

Kristin L. Gunckel, University Of Arizona
Daniel L. Moreno, University of Arizona
Sean Tan, University of California Berkeley
Anna McPherson, American Museum of Natural History
Sara J. Dozier, CSU Long Beach
Linda Morell, University Of California, Berkeley

Exploring the concept of scientific civic engagement and its role in developing science literacy skills

Jenny M Dauer, University of Nebraska-Lincoln
Irfanul Alam, University of Colorado Boulder
Lisa A Corwin, University of Colorado Boulder

Investigating The Effects Of Instructional Support On Students' Inquiry-based Writing In Chemistry

Jan-Martin Österlein, University of Duisburg-Essen
Mathias Ropohl, University of Duisburg-Essen
Sebastian Habig, Paderborn University
Miriam Morek, University of Duisburg-Essen

Studies on Visualization in Science Classrooms: A Systematic Literature Review

Mijung Kim, University of Alberta
Qingna Jin, University of Alberta

3/29/22

Strand 2: Science Learning: Contexts, Characteristics and Interactions

Poster-Strand 2 Poster Session

10:45 AM-12:00 PM

Factors Influencing Evolution Acceptance: A Systematic Literature Review and Meta-Analysis

Daniela Fiedler, Department of Biology Education, IPN - Leibniz Institute for Science and Mathematics Education, Kiel, Germany

Influence of Digital Learning Design Features and Self-Regulation on Students' Behavioral and Emotional Engagement (Virtual)

Daniel Laumann, University of Münster

Julia Welberg, University of Münster

Julian Alexander Fischer, Leibniz Institute for Science Education (IPN) Kiel

Tatjana Steinmann, Leibniz University of Hannover

Susanne M. Heinicke, University of Münster

Susanne Weßnigk, Leibniz University of Hannover

Knut Neumann, Leibniz Institute for Science Education (IPN) Kiel

Interacting with Luna: Scientific characters and 3rd graders' construction of relationships with Science (Virtual)

Deborah Cotta, Universidade Federal de Minas Gerais

Danusa Munford, Faculdade de Educacao - Universidade Federal de Minas Gerais

Elaine S. França, Centro Pedagógico (1-9 grades school) - Universidade Federal de Minas Gerais

Investigating the Ways Students Leverage Lived Experience to Explain Phenomena (Virtual)

Kraig A. Wray, Pennsylvania State University

Amy R. Pallant, The Concord Consortium

Hee-Sun Lee, The Concord Consortium

Scott McDonald, Pennsylvania State University

Learning in Multidisciplinary Teams in a Challenge-Based Learning Course

Canan Mesutoglu,

Dürdane Dury Bayram-Jacobs, Eindhoven University of Technology

Make or Break Collaborative Disciplinary Engagement in Science: Managing Conceptual Uncertainty in Group Work

Harini Krishnan, Florida State University

Lama Jaber, Florida State University

Sherry A. Southerland, Florida State University

Scientists' and Teachers' Perceptions of Costs and Benefits in School-Based Citizen Science

Osnat Atias, University of Haifa

Ayelet Baram-Tsabari, Technion - Israel Institute of Technology

Ayelet Shavit, Technion - Israel Institute of Technology

Yael Kali, University of Haifa

Seasons in the Sun: Unpacking Seasons Lesson Approaches as Teachers Model Earth-based and Space-based Perspectives

Jennifer A. Wilhelm, University of Kentucky
Merryn Cole, University Of Nevada Las Vegas
Paula Ames, University of Kentucky
Jaden Hayes, University of Kentucky
Samantha Ringl, University of Kentucky

Social and material resources mediating young children's engagement in spatial sensemaking during summer engineering camp

Julia Plummer, Pennsylvania State University
Katie Nolan, Pennsylvania State University

Student Assertions in Science Discourse Spaces

Lauren Cabrera, Virginia Commonwealth University
Ananya Matewos, Saint Norbert College
Vivian Ali Zohery, University of Maryland - College Park
Doug Lombardi, University of Maryland, College Park

Supporting Discussion-based Science Practices for Special Education Students

Grace K. Baker, Penn State University
Emma J. Jacobson, Penn State University
Amy R. Pallant, The Concord Consortium
Hee-Sun Lee, The Concord Consortium
Scott McDonald, Pennsylvania State University

Supporting macro-ethical reasoning in college students' collaborative design work

Jennifer Radoff,
Chandra Turpen,

The Impact of COVID-19 Lockdown on Parents and Adolescent Children in Relation to Science Learning

Ella Ofek-Geva, Weizmann Institute of Science
Michal Vinker, Department of Pediatrics and Department of Pediatric Endocrinology and Diabetes, Assuta Ashdod University Medical Center, Ashdod, Israel
Yonatan Yeshayahu, Department of Pediatrics and Department of Pediatric Endocrinology and Diabetes, Assuta Ashdod University Medical Center, Ashdod, Israel
David L. Fortus, Weizmann Institute Of Science

Critical pedagogy of place to enhance ecological engagement activities: Expanding "place" beyond the biophysical

Andrea E Weinberg, Arizona State University
Amanda Cicchino, Colorado State University
Meena M. Balgopal, Colorado State University

Laura B. Sample McMeeking, Colorado State University STEM Center

3/29/22

Strand 3: Science Teaching — Primary School (Grades preK-6): Characteristics and Strategies

Poster-Strand 3 Poster Session

10:45 AM-12:00 PM

A Case of Revealing Preservice Elementary Science Teachers' Understanding of Models and Modeling Through Reflections (Virtual)

Ayca K Fackler, University of Georgia

Assessing Elementary Students' Science Interests and Career Aspirations

M. Gail Jones, North Carolina State University

Katherine Chesnutt, Appalachian State University

Megan Ennes, University of Florida

Daniel Macher, Karl-Franzens-University of Graz

Manuela Paechter, Karl-Franzens-University of Graz

Developing Routines for Planning Elementary Science Investigations

Annabel J Stoler, Boston University

Eve Manz, Boston University

Chris Georgen, Boston University

Examining the Relationship between Preschool Teachers' Attitudes and Beliefs towards Science and Classroom Practice

Elica B. Sharifnia, University of Miami

Daryl Greenfield, University of Miami

Exploring the Nature of Challenges Preservice Elementary Teachers Experience about Matter Content and Content Teaching

Jamie N. Mikeska, Educational Testing Service (ETS)

Heena R. Lakhani, University of Washington

Dante Cisterna, Educational Testing Service

Science, Language, and Equity Practices: How Teachers Respond to Professional Learning Focused on Epistemic Agency

Emily C. Miller, University of Wisconsin Madison

Emily Reigh, Stanford

Maria C. Simani, University Of California, Riverside

Teachers' planned use of place-based stories rooted in students' everyday experiences of natural phenomenon

Melissa J. Luna, West Virginia University

3/29/22

Strand 4: Science Teaching — Middle and High School (Grades 5-12): Characteristics and Strategies

Poster-Strand 4 Poster Session

10:45 AM-12:00 PM

Critical Discussions in Small Groups to Support the Design of Experiments

Takuya Matsuura, Hiroshima University

Urumi Hayashiuchi, Takehara City Educational Board

Innovative STEM curriculum to enhance students' engineering design skills and attitudes toward STEM (Virtual)

Meng-Fei Cheng, National Changhua University of Education

Yu-Heng Lo, National Changhua University of Education

Middle School Teachers' Self-efficacy for Teaching Science in a Computationally Rich Environment: A Mixed-Methods Study

Arif Rachmatullah, SRI International

Eric N. Wiebe, North Carolina State University

Science Instructional Practices: Comparison of Two Strategies for Students with Learning Disabilities (Virtual)

Gamze Karaer, University of Iowa

Macid Ayhan Melekoglu, Eskisehir Osmangazi University

Teachers' Conceptions of Phenomena in the Secondary Science Classroom

Daniel Pimentel, Stanford University

The Challenges of Teaching in Charter Schools and How They were Overcome During the COVID-19 Pandemic (Virtual)

Pamela Huff, Doctoral Candidate

Gail Jones, North Carolina State University

3/29/22

Strand 5: College Science Teaching and Learning (Grades 13-20)

Poster-Strand 5 Poster Session

10:45 AM-12:00 PM

Cultivating and supporting STEM faculty allyship

Thanh K. Le, Western Washington University

Regina Barber DeGraaff, Western Washington University

Leticia Romo, Chaffey College

Design and Outcomes for Computational Interest, Competency Belief, and Anxiety in "Science for Future Presidents"

Sheikh Ahmad Shah, Boston College

David W. Jackson, Boston College and Waltham (MA) Public Schools

Exploring of environmental engineering college students' social responsibility and problem solving through the SSI project

Yohan Hwang, Seoul National University

Kongju Mun, Dongduk Women's University

Kyung-Suk Cho, Ewha Womans University

Hyunju Lee, Ewha Womans University

Exploring the Perception of College Students in STEM Fields on Social Responsibility of Scientists and Engineers (Virtual)

Hyunju Lee, Ewha Womans University

Yuhyun Choi, Chungnam National University

Seung-Yong Ok, Hankyong National University

Chang-Hoon Nam, Daegu Gyeongbuk Institute of Science & Technology

Sungok Seren Shim, Ball State University

Yohan Hwang, Seoul National University

Yeonjoo Ko, Ewha Womans University

Kyungmi Lee, Ewha Womans University

Investigating learning assistants' use of questioning in the online setting of an inquiry-oriented physics course (Virtual)

Jianlan Wang, Texas Tech University

Yuanhua Wang, West Virginia University

Beth Thacker, Texas Tech University

Stephanie Hart, Texas Tech University

Preparing Graduate Students for Success: Validating Interdisciplinary Skill Development Needs

Nicole Campbell, Western University

Mohammed Estaiteyeh, Western University

Isha DeCoito, Western University

Student Participation and Self-Efficacy in Communities of Practice in Remote Undergraduate Physics Laboratories

Drew Jason Rosen, University of Maine Stony Brook University

Angela M. Kelly, Stony Brook University

Supporting New Research on Teaching Professional Development for Graduate Student: Progression and Personal/Professional Benefits (Virtual)

Gili Marbach-Ad, University Of Maryland

Patrick Sheehan, University Of Maryland

Bridgette Heine, University Of Maryland

Grant E. Gardner, Middle Tennessee State University

Judith S. Ridgway, The Ohio State University

Kristen Miller, University of Georgia

Elisabeth Schussler, University Of Tennessee

The Interconnectedness of Chemical contents – a Challenge for Teacher Training

Marina Regina Birkenstock, University of Kassel

David S. Di Fuccia, University of Kassel

Oral Communication in Postsecondary Science Education: Relationship between Dimensions of Attitude and Students' Oral Skills

Caroline Cormier, Cégep André-Laurendeau

Simon Langlois,

3/29/22

Strand 6: Science Learning in Informal Contexts

Poster-Strand 6 Poster Session

10:45 AM-12:00 PM

*"We're Not that Different": Typologies of Guests' Relationships to Museum Objects via
Mechanic Assemblage within a Dinosaur Gallery*

Joshua Cruz, Texas Tech University

Rebecca Hite, Texas Tech University

Richard C. Velasco, University of Iowa

*Peer-to-Peer Seminars: Proposal to Use Peers and Structure to Promote Student Learning at
Research Seminars*

Elizabeth W Kelley, University of Chicago

*Social Network Analysis as a Tool to Operationalize Communities of Practice and Document
Social Learning*

K. C. Busch, North Carolina State University

Lynn Chesnut, North Carolina State University

Using Augmented Reality (AR) to Bring the Past to Life in Informal Science Learning

Imogen Herrick, University of Southern California

Gale Sinatra, University of Southern California

Alana Kennedy, University of Southern California

Benjamin Nye, University of Southern California

Bill Swartout, University of Southern California

Emily Lindsey, The La Brea Tar Pits Museum

3/29/22

Strand 7: Pre-service Science Teacher Education

Poster-Strand 7 Poster Session

10:45 AM-12:00 PM

Impact of Inquiry Lesson Experiences on Development of Preservice Elementary Teachers' Effective Science Teaching Beliefs

Kelsey Beeghly, University of Central Florida

Participating in online Teacher Learning Communities as a Tool for Pre-Service Teacher Education (Virtual)

Loucas T. Louca, European University-Cyprus

Theopisti Skoulia, European University-Cyprus

Teaching as enactment of habitus: Preparing preservice science teachers for new ways of teaching science

Hildah K. Makori, Iowa State University

Understanding Elementary Preservice Teachers' Beliefs about the Importance and Value of the NGSS Science Practices

Elsun Seung, Indiana State University

Vance J. Kite, North Carolina State University

Soonhye Park, North Carolina State University

Aeran Choi, Ewha Womans University

Using a PCK lens to capture pre-service science teachers' internalized knowledge of Nature of Science

Louise Lehane, llehane@stangelas.nuigalway.ie

Preservice Science Teachers' Informal Reasoning Modes in Two Different Issue Contexts (Virtual)

Nilay Ozturk, Kirsehir Ahi Evran University

Kubra Yolacti-Kizilkaya, Kirsehir Ahi Evran University

3/29/22

Strand 8: In-service Science Teacher Education

Poster-Strand 8 Poster Session

10:45 AM-12:00 PM

Investigating Impacts of Professional Development on High School Physics Teachers' Collaboration and Lesson Planning (Virtual)

James B. Hancock, Alma College

Jack T Poling, Alma College

A Cross-Case Analysis of In-Service Science Teacher's Assessment Literacy in Model-Based Teaching

Alexis Gonzalez-Donoso, University of British Columbia

Samia Khan, University of British Columbia

An Online Professional Development Community (APTeach): Teacher Perception and Practice

Fatma Kaya, Middle Tennessee State University

Preethi Titu, Kennesaw State University

Siyang Jiang, Stony Brook University

Jiecheng Song, Stony Brook University

Steven Berryhill, Middle Tennessee State University

Amanda S. Perez, Carnegie Mellon University

Chinmay Kulkarni, Carnegie Mellon University

Wei Zhu, Stony Brook University

David Yaron, Carnegie Mellon University

Greg Rushton, Middle Tennessee State University

Analyzing Teaching Perceptions of Utilizing a District Level Professional Learning Community to Identify Guaranteed Curriculum (Virtual)

Kristin E Mansell,

Examine Chinese In-service Science Teachers' Views of Nature of Science

Yang Yang, Beijing Normal University

Qin Yan, Beijing Normal University

Jing Lin, Beijing Normal University

Exploration of Epistemic Orientation towards Teaching Science in a Longitudinal Professional Development Study

Sierra L. Morandi, Florida State University

Claudia Hagan, Georgia State University

Ellen M. Granger, Florida State University

Jennifer Schellinger, Florida State University

Sherry A. Southerland, Florida State University

Exploring Early Enactment Attempts for Integrating Engineering Design Practices in High School Biology

Jonathan Singer, University of Maryland, Baltimore County
Jacqueline Krikorian, Baltimore City Public Schools
Tory H. Williams, University of Maryland Baltimore County
Christopher Rakes, University of Maryland, Baltimore County
Julie Ross, Virginia Tech

Listening to Find Integrated STEM Discourse: Power and Positioning During a Teacher Professional Development STEM Activity (Virtual)

Andria C. Schwartz, University of Wyoming
Andrea C. Burrows, University Of Wyoming

Lived Experiences of K-12 Teachers Who Attended Professional Development Hosted By Informal Education Institutions

Vashunda Williams Warren, Dallas Baptist University

Professional Development Principles to Advance Socio-scientific Issue-oriented Science Education: The Case of British Columbia.

Travis T. Fuchs, The University of British Columbia
Anthony Clarke, The University of British Columbia

Questionnaire Measuring Teachers' Perception of Practical Work in Inclusive Physics Lessons

Laura Sühlig, Department of Physics Education, Goethe University Frankfurt
Katja Hartig, Institute of Psychology, Goethe University Frankfurt
Roger Erb, Department of Physics Education, Goethe University Frankfurt
Albert Teichrew, Department of Physics Education, Goethe University Frankfurt
Jan Winkelmann, University of Education Schwäbisch Gmünd
Holger Horz, Institute of Psychology, Goethe University Frankfurt
Mark Ullrich, Institute of Psychology, Goethe University Frankfurt

Science Teachers' Interactions With and Conceptions of Curriculum Use

Byung-Yeol Park, University of Connecticut
Todd Campbell, University of Connecticut
Miriah Kelly, Southern Connecticut State University
Chester Arnold, University of Connecticut

SCIENCE TEACHING PERFORMANCE: INVESTIGATING GENDER, QULIFICATION, AND TEACHING EXPERIENCES

Hiya M. Almazroa, Princess Nourah Bint Abdulrahman University
Eman M Alrwaythi, Allmam Muhammad Ibn Saud University
Fahad S. Alshaya, King Saud University

Teacher's Readiness to Promote Science-related Career Awareness Among Middle School Students

Regina Soobard, University Of Tartu

Ana Valdmann, University Of Tartu
Miia Rannikmae, University Of Tartu

3/29/22

Strand 10: Curriculum and Assessment

Poster-Strand 10 Poster Session

10:45 AM-12:00 PM

Assessing the Inquiry Practices of Teachers in the Philippines (Virtual)

Dennis L. Danipog, National Institute for Science and Mathematics Education Development,
University of the Philippines Diliman

Suzanne Rice, Assessment Research Centre, University of Melbourne

Zhonghua Zhang, Assessment Research Centre, University of Melbourne

Implementation of the ALL for Science Framework Across Three Grade Levels

Nancy Moreno, Baylor College of Medicine

Alana Newell, Baylor College Of Medicine

Lollie Garay, Baylor College of Medicine

Misty Sailors, University of North Texas

*Relationships Among Teacher Beliefs About STEAM Education, Perceptions of School Climate,
and Enacted Practices.*

Jaymie Paige Stein, Fordham University

John Craven, Fordham University

*Video-based Instruments as Assessment Tool in Science Teacher Education: A Systematic
Literature Review*

Yuxi Huang, University of Georgia

Hatice Ozen Tasdemir, The University of Georgia

3/29/22

Strand 11: Cultural, Social, and Gender Issues

Poster-Strand 11 Poster Session

10:45 AM-12:00 PM

Uncovering Sex and Gender Language in High School Biology Textbooks

Awais Syed, BSCS Science Learning

Dennis Lee, BSCS Science Learning

Monica Weindling, BSCS Science Learning

Sophie Arnold, New York University

Andrei Cimpian, New York University

Catherine Riegler-Crumb, University of Texas

Molly Stuhlsatz, BSCS Science Learning

Brian M. Donovan, BSCS Science Learning

Intervention Highlights the Importance of Career Awareness Promotion on Students' Equal STEM Career Awareness Development

Tormi Kotkas, University Of Tartu

Jack B. Holbrook, University Of Tartu

Miia Rannikmae, University Of Tartu

The new four-letter word, 'race': Exploring Teacher Positions within biology education and critical race theory.

Uchenna Emenaha, The University of Texas at San Antonio

John Henryism: Exploration of Physiological Examination of College STEM, Cumulative Trauma, Allostatic Load.

Douglas Lee Hoston,

Richard Lamb, University at Buffalo

Effectiveness and Inclusivity: determining best physics and astronomy departments for women of colour

Jaimie Lauren Miller-Friedmann, University of Birmingham

Nicola Wilkin, University of Birmingham

Exploring the prevalence of whiteness within science education using duoethnographic methods

Jennifer Jackson, Pennsylvania State University

Jonathan D. McCausland, Pennsylvania State University

Faculty Awareness and Responsiveness to Inclusivity in STEM Classrooms

Grant E. Gardner, Middle Tennessee State University

Olena T James, Middle Tennessee State University

Sarah Bleiler-Baxter, Middle Tennessee State University

Gregory Rushton, Middle Tennessee State University

Fonya Crockett Scott, Middle Tennessee State University

Amanda Heath, Middle Tennessee State University
Theresa Ayangbola, Middle Tennessee State University

Identifying the Methods District Science Coordinators Utilize to Monitor and Promote Equity

Shaugnessy McCann,

Yamil Ruiz,

Brooke A. Whitworth, Clemson University

Julie A. Luft, University of Georgia

Instructor Impact on the Equity of Collaborative Small Groups in a Science Class

Mary Binzley, Grinnell College

Paul Hutchison, Grinnell College

Examining Moments of Liberatory Design Possibility in Youth-centered Engineering Design Practice

Jacqueline Handley, University of Michigan

3/29/22

Strand 12: Technology for Teaching, Learning, and Research

Poster-Strand 12 Poster Session

10:45 AM-12:00 PM

Applying the eye tracking method to analyze university learners' learning and reasoning behaviors in the Augmented Reality Environment (Virtual)

Fang-Ying Yang, National Taiwan Normal University

Yi-Wen Hung, The Affiliated Senior High School of National Taiwan Normal University

Yuan-Li Liu, National Taiwan Normal University

Automated Assessment of Students' Response to Free-response Items on Particulate Nature of Matter Utilizing AI

Gyeong-Geon Lee, Seoul National University

Hun-Gi Hong, Seoul National University

Jaeyong Lee, Seoul National University

CryptoComics: Design of an Integrative STEM+C Transmedia Curriculum

Pavlo D. Antonenko, University Of Florida

Kara Dawson, University of Florida

Zhen Xu, University of Florida

Do Hyong Koh, University of Florida

Christine Wusylko, University of Florida

Amber Benedict, Arizona State University

Swarup Bhunia, University of Florida

Exploring Science Student Learning Outcomes using Machine Learning Classifications During Online Sessions

Richard Lamb, East Carolina University

Knut Neumann, Leibniz Institute for Science Education (IPN) Kiel

Investigating Differential Effects of a Digital 'Ladder of Learning' With Adaptive Support in Chemistry

Michelle Möhlenkamp, University of Duisburg-Essen

Helena Van Vorst, University of Duisburg-Essen

Sebastian Habig, University of Duisburg-Essen

Mathias Ropohl, University of Duisburg-Essen

Scaffolding Scientific Argumentation in a Science Inquiry Unit

Kathryn Rupp, Northern Illinois University

Karyn Higgs, Northern Illinois University

M. Anne Britt, Northern Illinois University

Kathleen Easley, The Learning Partnership

Randi McGee-Tekula, The Learning Partnership

Steven McGee, The Learning Partnership

School Leaders Learning How to Observe Science Teachers Using Equitable Discourse Through Virtual Reality

Len Annetta, East Carolina University
Matthew Militello, East Carolina University
Lynda Tredway, Institute for Educational Leadership
Lawrence Hodgkins, East Carolina University
Ken Simon, Institute for Educational Leadership
Jim Argent, East Carolina University

The Science of Data Visualization Comprehension: Analysis of Seminal Theoretical Frameworks

Kristine A. Antonyan, University of Florida
Pavlo D. Antonenko, University Of Florida

Tracing the Development of a Haptically-enabled Science Simulation (HESSs) for Force and Motion

James Minogue, North Carolina State University
Emily Brunsen, North Carolina State University
Tabitha Peck, Davidson College
David Borland, RENCI

Was that Productive? Exploring Student-Student Verbal Interactions while Engaged with Virtual Learning Environments about Magnetism

Joey D Marion, North Carolina State University
James Minogue, North Carolina State University
Michaela O'Leary, North Carolina State University
Katee Finegan, North Carolina State University

3/29/22

Strand 13: History, Philosophy, Sociology, and Nature of Science

Poster-Strand 13 Poster Session

10:45 AM-12:00 PM

Considering the conceptual role of compassion in socioscientific issues research

David C. Owens, Georgia Southern University

Dana L. Zeidler, University Of South Florida

Developing Pre-Service Teachers' Understanding of the Distinctions Between Science and Engineering

Jacob Pleasants, University of Oklahoma

Jennifer C. Parrish, University of Northern Colorado

Anne Leak, Assistant Professor, High Point University

EXPLORING THE COMPLEXITY OF STUDENT-CREATED MIND MAPS, BASED ON SCIENCE-RELATED CORE IDEAS

Helen Semilarski, Doctoral student

Regina Soobard, Research Fellow of Science Education

Jack Holbrook, Professor

Miia Rannikmae, Professor

Moroccan Science Professors' Nature of Science's Understandings and Perceptions on its Instruction for Preservice Teachers

Farnaz Avarzamani, Mary Lou Fulton Teachers College, Arizona State University, Tempe, AZ

Mila Rosa Librea Carden, Mary Lou Fulton Teachers College, Arizona State University, Tempe, AZ

Peter Rillero, Mary Lou Fulton Teachers College, Arizona State University, Tempe, AZ

Florence Hamel, Gary Herberger Young Scholars Academy, Mary Lou Fulton Teachers College, Arizona State University, Tempe, AZ

3/29/22

Strand 14: Environmental Education and Sustainability

Poster-Strand 14 Poster Session

10:45 AM-12:00 PM

Ambitious Science Teaching as a way of integrating place-based and systems-literacy learning

Madison Botch, Pennsylvania State University

Amy R. Pallant, The Concord Consortium

Hee-Sun Lee, The Concord Consortium

Scott McDonald, Pennsylvania State University

Exploring 6th-Grade Students Model-Based Reasoning about Energy Flow Between Societal and Earth Systems

Laura Zangori, University Of Missouri

Laura B Cole, University of Missouri

Mohammad Dastmalchi, University of Missouri

Exploring the Potential for Place-Based Ecology Lessons in Middle School Science Classes

Sara L. Salisbury, Middle Tennessee State University

Fonya Crockett Scott, MTSU

Fourth Graders' Knowledge of Energy and Environmental Literacy and Application through Flashlight Design

Heidi Masters, University Of Wisconsin–La Crosse

Vanashri J. Nargund, New Jersey City University

Unite for the environment: Examining the impact a sustainable livelihoods program on pro-environmental behaviors in Ugandan student households near a biodiversity hotspot

Sarah J. Carrier, North Carolina State University

Aimee B Fraulo, North Carolina State University

Corinne Kendall, North Carolina Zoo

Austin Leeds,

Tinka John, UNITE

Elizabeth Folta, North Carolina Zoo

Kristen E Lukas, Cleveland Metro Parks Zoo

Adolescent Framings of Climate Change, Psychological Distancing & Implications for Climate Change Concern and Behavior (Virtual)

Regina Ayala Chavez, North Carolina State University

K. C. Busch, North Carolina State University

3/29/22

Strand 15: Policy, Reform, and Program Evaluation

Poster-Strand 15 Poster Session

10:45 AM-12:00 PM

Expression of Next Generation Science Standards in Picture Books

Kelly Marie Shepard, Illinois Institute of Technology

Faculty Voices on the Implementation of Science Education Policy in Higher Education-A Case Study

Mercy Ogunsola-Bandele, National Open University Of Nigeria

Bamikole O. Ogunleye, National Open University Of Nigeria

3/29/22

Strand 2: Science Learning: Contexts, Characteristics and Interactions

SC-organized paper set-Theoretical & Literature Review Papers

2:00 PM-3:30 PM

President: Catherine Mary Kenyon, Clemson University

Emotions in Science Learning and Teaching: A Systematic Review (Virtual)

Xiao Chen, East China Normal University

Sihan Xiao, East China Normal University

Fresh Air: Glowing Conspirations Towards Scientific Fluency

Hartley Banack, University of Northern British Columbia (UNBC)

Gerald Tembrevilla, Mount Saint Vincent University

Claire Robson, Adjunct Faculty at Simon Fraser University

Anne Robillard, Graduate Student, Department of Curriculum and Pedagogy, Faculty of Education, UBC

The motivational consequence of pattern-seeking fatigue

Elon Langbeheim, Ben-Gurion University of the Negev

Edit M. Yerushalmi, Weizmann Institute of Science

Transformative Science Education: A Review of Transformative Experience Theory

Kevin J Pugh, University of Northern Colorado

3/29/22

Strand 2: Science Learning: Contexts, Characteristics and Interactions

SC-organized paper set-Distance/online Science Teaching & Learning

2:00 PM-3:30 PM

Presider: Hadeel Omar Edrees Dabbah, Ben-Gurion University of the Negev

Science Teaching Practices and Student Engagement in HyFlex Learning Environments

Hong H. Tran, University of Georgia

Yuxi Huang, University of Georgia

Cheng-Wen (Nuby) He, University of Georgia

Brooke A. Whitworth, Clemson University

Yamil Ruiz, Clemson University

Shaugnessy McCann, University of Georgia

Julie A. Luft, University of Georgia

Shifting to Distance Learning of Science in China and Israel: A Comparative Study of Students and Teachers

David L. Fortus, Weizmann Institute of Science

Jing Lin, Beijing Normal University

Shira Passentin, Weizmann Institute of Science

The effect of in-person vs. distance learning on the quality of students' learning

Julian A. Fischer, Leibniz Institute for Science Education (IPN) Kiel

Tatjana Steinmann, Leibniz University of Hannover

Daniel Laumann, University of Münster

Susanne Weßnigk, Leibniz University of Hannover

Knut Neumann, Leibniz Institute for Science Education (IPN) Kiel

3/29/22

Strand 4: Science Teaching — Middle and High School (Grades 5-12): Characteristics and Strategies

SC-organized paper set-Discourse and argumentation in secondary science teaching

2:00 PM-3:30 PM

Presenter: Imogen Herrick, University of Southern California

Argumentation with Summary Tables in geoscience learning

Brandin M Conrath, Pennsylvania State University

Kathryn M. Bateman, Temple University

Amy R. Pallant, The Concord Consortium

Hee-Sun Lee, The Concord Consortium

Scott McDonald, Pennsylvania State University

Discourse in Inquiry Science Classrooms (DiISC) Version 2.0: Developing a Validity Argument for a Secondary Science Classroom Observation Instrument (Virtual)

Elizabeth B Lewis, University of Nebraska–Lincoln

Lyrice L Lucas, University of Nebraska–Lincoln

Brandon A Holding, University of Nebraska-Lincoln

Amy Tankersley, University of Nebraska-Lincoln

Ana M Rivero, Seattle University

Elizabeth Hasseler, University of Nebraska-Lincoln

Dale R Baker, Arizona State University

Teachers' Instructional Vision and Practices around Promoting Productive Talk in Science Classrooms

Ozlem Akcil Okan, Florida State University

Miray Tekkumru Kisa, Florida State University

3/29/22

Strand 5: College Science Teaching and Learning (Grades 13-20)

SC-organized paper set-Collaborative Learning in Remote Contexts

2:00 PM-3:30 PM

President: Gena C. Sbeglia, Stony Brook University

"It truly benefited me!": Surprising Learning Benefits for Collaborating Education and Engineering Undergraduates During COVID

Kristie S. Gutierrez, Old Dominion University

Jennifer Kidd, Old Dominion University

Min Jung Lee, Old Dominion University

Pilar Pazos, Old Dominion University

Krishna Kaipa, Old Dominion University

Stacie I. Ringleb, Old Dominion University

Orlando Ayala, Old Dominion University

Cyber Peer Led Team Learning (cPLTL) Supports Women in Science, Engineering, Technology, and Mathematics (STEM)

Mariah Claire Maxwell, Syracuse University

Jason R. Wiles, Syracuse University

Exploring the Impact of Peer-to-Peer Interactions on Learning and Course Performance in an Online Environment (Virtual)

Anshuman Swain, University of Maryland, College Park

Marcia Shofner, University of Maryland, College Park

William F Fagan, University of Maryland, College Park

Gili Marbach-Ad, University Of Maryland, College Park

Student In-The-Moment Learning in LA-Facilitated Interactions in Undergraduate Chemistry and Physics Courses

Jessica Karch, Tufts University

Ira Caspari, Tufts University

3/29/22

Strand 6: Science Learning in Informal Contexts

SC-organized paper set-Informal learning in the community

2:00 PM-3:30 PM

Presider: Wanja Gitari, University of Toronto

Measuring Electro Dermal Activity (EDA) to detect and identify emotional engagement during family science activities

Neta Shaby, Ben Gurion University of the Negev

Dana Vedder-Weiss, Ben-Gurion University Of the Negev, Israel

Youth Environmental Science Learning and Agency: a Unifying Lens Across Community and Citizen Science Settings

Ana I. Benavides Lahnstein, Natural History Museum, London, UK

Heidi L. Ballard, University of California, Davis, CA, USA

Maryam Ghadiri Khanaposhtani, University of California, Davis, CA, USA

Julia Lorke, IPN - Leibniz Institute for Science and Mathematics Education, Kiel, Germany

Christothea Herodotou, Open University, Milton Keynes, UK

Annie E. Miller, California Academy of Sciences, San Francisco, CA, USA

Sasha Pratt-Taweh, Natural History Museum, London, UK

Jessie Jennewein, Natural History Museum of Los Angeles County, CA, USA

Maria Aristeidou, Open University, Milton Keynes, UK

Nashwa Ismail, Open University, Milton Keynes, UK

Youth Participatory Action Research: Positioning Science Learning as and for Community Participation (Virtual)

Steven Worker, University Of California

Martin H. Smith, University Of California

Sally Neas, Graduate Student, University of California, Davis

Car Mun Kok, 4-H Youth Development Advisor, University of California, Agriculture and Natural Resources

Dorina Espinoza, Youth, Families and Communities Advisor, University of California, Agriculture and Natural Resources

3/29/22

Strand 7: Pre-service Science Teacher Education

SC-organized paper set-Integrating Engineering into science education

2:00 PM-3:30 PM

President: Carlos Mometti, School of Education / University of São Paulo

Placing Empathy at the Center of Engineering: Design Thinking Embraced by Preservice Teachers for Engineering Design (Virtual)

Myunghwan Shin, California State University, Fresno

Jane J. Lee, Michigan State University

The Importance of Enactive Mastery Experiences: Teaching Engineering Self-Efficacy in a Pandemic

Matthew P. Perkins Coppola, Purdue University Fort Wayne

Using Card Sort Epistemic Network Analysis to Explore Preservice Teachers' Ideas about the Nature of Engineering

Jennifer C. Parrish, University of Northern Colorado

Jacob Pleasants, University of Oklahoma

Joshua Reid, Middle Tennessee State University

Bridget K. Mulvey, Kent State University

Erin E. Peters-Burton, George Mason University

3/29/22

Strand 8: In-service Science Teacher Education

SC-organized paper set-Professional Learning for STEM

2:00 PM-3:30 PM

President: Venkat Rao Vishnumolakala, Curtin University

How some early-career STEM teachers achieved agency during the COVID-19 pandemic

Meena M. Balgopal, Colorado State University

Elizabeth Diaz-Clark, Colorado State University

Andrea Weinberg, Arizona State University

Laura B. Sample McMeeking, Colorado State University

Diane Susan Wright, Colorado State University

Danielle E. Lin Hunter, Colorado State University

STEM Labs: The Future of Professional Development for Early STEM

Hope K. Gerde, Texas A&M University

Gary E. Bingham, Georgia State University

Melody Kung, Georgia State University

Arianna Pikus, Michigan State University

Hannah Etchison, Georgia State University

What Works in K-12 STEM Professional Development Programs?: A Meta-Analysis of its Impacts on Teachers and Students

Hye Sun You, Arkansas Tech University

Sunyoung Park, California Lutheran University

Minju Hong, University of Georgia

Teaching Science for Social Justice Using an Identity Framework

Katherine Wade-Jaimes, University of Nevada

Rachel D. Askew, Vanderbilt University

3/29/22

Strand 10: Curriculum and Assessment

SC-organized paper set-Educative features and implementations of NGSS-aligned curricula

2:00 PM-3:30 PM

Presider: Cari F. Herrmann Abell, BSCS Science Learning

Proposing a Framework to Analyze Educative Features in NGSS-aligned Science Curricular Materials (Virtual)

Soo-Yean Shim, University of Illinois at Urbana Champaign

Kevin Hall, University of Illinois at Urbana Champaign

Tania Jarosewich, Consejo Group

Stina Krist, University of Illinois at Urbana-Champaign

Mon-Lin Monica Ko, University of Illinois at Chicago

Barbara Hug, University of Illinois at Urbana-Champaign

Learning to Teach with Storyline Curriculum Materials

Annie Allen, University of Colorado Boulder

Clarissa Deverel-Rico, University of Colorado Boulder

William R. Penuel, University of Colorado Boulder

Carol Pazera, University of Texas Austin

Variation in the Implementation of Educative Curriculum Materials for Teacher Educators in Two Course Contexts (Virtual)

Deborah L. Hanuscin, Western Washington University

Josie C. Melton, Western Washington University

Emily J. Borda, Western Washington University

Jamie N. Mikeska, Educational Testing Service (ETS)

Inequitable opportunities to learn: Frequency of inquiry-based teaching in the United States (Virtual)

Sara J. Dozier, Stanford University

3/29/22

Strand 11: Cultural, Social, and Gender Issues

SC-organized paper set-Diverse Student Conceptions of Science and Engineering

2:00 PM-3:30 PM

Presider: Catherine Quinlan, Howard University

A Comparative Case Study Investigating Indigenous/Rural Elementary Students' Conceptions of Community Engineering

Rebekah Hammack, Montana State University

Tina Vo, University of Nevada- Las Vegas

Miracle Moonga, Montana State University

"We think this way as a society!": Community-level Science Literacy among ultra-Orthodox Jews

Ayelet Baram-Tsabari, Technion - Israel Institute of Technology

Lea Taragin-Zeller, Technion - Israel Institute of Technology

Yael Rozenblum, Technion - Israel Institute of Technology

Further Probe into Culture, Context and Scientific Explanations by Biology Students: An African Case Study

Peter A. Okebukola, ACEITSE- Lagos State University

Tunde Owolabi, ACEITSE-Lagos State University

Foluso O Okebukola, LASEED-Lagos State University

Students' Considerations of Epistemic Criteria and Subsequent Tensions in Mixed-gender Engineering Groups (Virtual)

Christina L. Baze, University of Arizona

María González-Howard, University of Texas at Austin

3/29/22

Strand 11: Cultural, Social, and Gender Issues

Symposium-Designing and Implementing Virtual Black STEM Counterspaces to Elevate Black Learners

2:00 PM-3:30 PM

Discussant: ReAnna Roby, Vanderbilt University

Presider: Cailisha L. Petty, North Carolina A&T State University

Designing and Implementing Virtual Black STEM Counterspaces to Elevate Black Learners

Terrell R. Morton, University of Missouri - Columbia

Angela White, North Carolina A&T State University

Nehemiah Mabry, STEMedia

Justin Shaifer, FascinateSci

Natalie S. King, Georgia State University

Kilan Ashad-Bishop, University of Miami, IndentifySTEM

Kelly Knight, George Mason University

Rachedia Lewis, University of Georgia

Cailisha L. Petty, North Carolina A&T State University

ReAnna S. Roby, Vanderbilt University

3/29/22

Strand 12: Technology for Teaching, Learning, and Research

SC-organized paper set-Fostering scientific inquiry through applications of technology

2:00 PM-3:30 PM

Presider: Lisa Lundgren, Utah State University

Cutting-edge Evolution Research Made Available to High-school Students: Assessing Students' Views of Scientific Inquiry (Virtual)

Bat-Shahar Dorfman, Weizmann Institute of Science

Amir Mitchell, Program in Systems Biology, University of Massachusetts Medical School, Worcester, Massachusetts, United States of America, Program in Molecular Medicine, University of Massachusetts Medical School, Worcester, Massachusetts, United States of America

Orna Dahan, Department of Molecular Genetics, Weizmann Institute of Science, Rehovot, Israel

Anat Yarden, Weizmann Institute Of Science

Research of Online Scientific Inquiry with/without Computer Simulation on 8th Graders' Performance of Scientific Inquiry

Ren-Jye Chou, Institute of Education National Yang Ming Chiao Tung University

Hsiao-Ching She, Institute of Education National Yang Ming Chiao Tung University

Meng Jun Chen, Institute of Education National Yang Ming Chiao Tung University

Technology-enhanced Inquiry-based Learning: Facilitating Motivation to Learn Science Among Elementary School Students

Tamar Ginzburg, Technion - Israel Institute of Technology

Miri I. Barak, Technion - Israel Institute Of Technology

3/29/22

Strand 13: History, Philosophy, Sociology, and Nature of Science

SC-organized paper set-Sociocultural and socio-scientific issues

2:00 PM-3:30 PM

President: Valarie L. Akerson, Indiana University

Developing Argumentation Skills on Socio-Scientific Issues through Evaluating Digital Sources and Engaging in Reflective Discussions

Shaghig Garo Chaparian, New York University

Saouma B. Boujaoude, American University Of Beirut

Effects of Subsuming Standards-based Objectives within the SSI Framework on Content Acquisition and Global Citizenship

Karrie A. Wikman, University of South Florida

Identifying Evidence of Student Global Discourse in Socioscientific Issues Research

Mary E. Short, The George Washington University

University Biology Students' COVID-19 Decisions: The Interconnected Influence of COVID-19 Science Perceptions and Sociocultural Membership

Benjamin C Herman, Texas A&M University

Michael P Clough, Texas A&M University

Asha Rao, Texas A&M University

Ben Janney, Texas A&M University

Alex Sobotka, Texas A&M University

Sarah Poor, Texas A&M University

Aaron Kidd, Texas A&M University

3/29/22

Strand 14: Environmental Education and Sustainability

***Symposium-Preparing Pre-College Students to Solve Emerging Interdisciplinary Problems:
Integrating Life Science and Engineering in Classrooms***

2:00 PM-3:30 PM

Discussant: Emily Dare, Florida International University

Presenter: Erin M. Furtak, University Of Colorado

*Preparing Pre-College Students to Solve Emerging Interdisciplinary Problems: Integrating Life
Science and Engineering in Classrooms*

Christine M. Cunningham, Pennsylvania State University

Gregory J. Kelly, Pennsylvania State University

Debra Bernstein, TERC

Michael Cassidy, TERC

Selcen Guzey, Purdue University

Lynn A. Bryan, Purdue University

Nancy B. Songer, University of Utah

Kirby Whittington, The University of Utah

Erin M. Furtak, University Of Colorado

Emily A. Dare, Florida International University

3/29/22

Publications Advisory Committee

Admin Symposium-Publishing, Reviewing, and Writing for JRST

2:00 PM-3:30 PM

Publishing, Reviewing, and Writing for JRST

Felicia Moore Mensah, Teachers College, Columbia University

Troy Sadler, University of North Carolina at Chapel Hill

Li Ke, University of North Carolina at Chapel Hill

3/29/22

Multi-Strand

Virtual Session F

2:00 PM-3:30 PM

Adaptation and Validation of a Questionnaire for Measuring Teachers' Views on Nature of Science (Virtual)

Rachel Takriti, United Arab Emirates University

Hassan H. Tairab, United Arab Emirates University

Sibel Erduran, University of Oxford

Ebru Kaya, Bogazici University

Najwa Alhosani, United Arab Emirates University

Lutfieh M Rabbani, United Arab Emirates University

Iman AlAmirah, United Arab Emirates University

Design of Elementary, Middle School and Secondary Science Methods Courses by Prospective Science Teacher Educators: Contents, Decision Making Process and Challenges (Virtual)

Jose M. Pavez, University of Georgia

Preservice Science Teachers' Implementation and Self-Efficacy About The Science And Engineering Practices (Virtual)

Fatma Kaya, Middle Tennessee State University

Lisa A. Borgerding, Kent State University

Shannon L. Navy, Kent State University

3/29/22

Strand 2: Science Learning: Contexts, Characteristics and Interactions

SC-organized paper set-Socioemotional Factors in Science Teaching & Learning

3:40 PM-5:10 PM

President: Adrian Adams, University of Utah

Curriculum-Aligned Instruction and Formative Assessments: Promote Students' Academic and Social-Emotional Learning

I-Chien Chen, Michigan State University

Tingting Li, Michigan State University

Selin Akgun,

Emily C. Adah Miller, University of Wisconsin Madison

Joseph S. Krajcik, Michigan State University

Barbara Schneider, Michigan State University

How do immigrant students' self-theories affect PISA 2018 science achievement in three Anglophone countries?

Sibel KAYA, Kocaeli University

Nurullah Eryilmaz, University of Bath, UK

Dogan Yuksel, Kocaeli University, Turkey

Reducing Anxiety and Promoting Meaningful Learning of Difficult Biology Concepts: Can CTCA be a Fix?

Franklin U. Onowugbeda, ACEITSE – Lagos State University

Peter A. Okebukola, ACEITSE – Lagos State University

Deborah Oluwatosin Agbanimu, ACEITSE – Lagos State University

Fred A. Awaah, University of Professional Studies Accra

Ibukunolu Adebisi Ademola, ACEITSE – Lagos State University

Olasunkanmi Adio Gbeleyi, ACEITSE- Lagos State University

Adekunle Ibrahim Oladejo, ACEITSE – Lagos State University

Esther Oluwafunmilayo Peter, ACEITSE – Lagos State University

Adeleke Micha Ige, ACEITSE – Lagos State University

Science Learning, Theatre, and Practices of Respect: Generative Engagement through Embodying Science in Urban Elementary Classrooms

Rebecca Kotler, University of Illinois at Chicago

Maria Varelas, University Of Illinois At Chicago

Nathan Phillips, University Of Illinois At Chicago

Rachelle Tsachor, University Of Illinois At Chicago

Rebecca Woodard, University Of Illinois At Chicago

Amanda Diaz, University Of Illinois At Chicago

Meghan Rock, University Of Illinois At Chicago

Zachary Sabitt, University Of Illinois At Chicago

Using ML-PBL Teaching Practices to Support Student Sensemaking and Social-Emotional Learning in Elementary Science Classrooms

Selin Akgun, Michigan State University

I-Chien Chen, Michigan State University

Tingting Li, Michigan State University

Emily C. Miller, University of Wisconsin Madison

Joseph S. Krajcik, Michigan State University

Susan K. Codere, MSU CRETE for STEM

3/29/22

Strand 2: Science Learning: Contexts, Characteristics and Interactions

Related Paper Set-The Influence of Religious Identity in Evolution Education

3:40 PM-5:10 PM

Discussant: M. Elizabeth Barnes, Department of Biology, Middle Tennessee State University, USA

Presenter: Daniela Fiedler, Department of Biology Education, IPN – Leibniz Institute for Science and Mathematics Education, Kiel, Germany,

The Influence of Religious Identity in Evolution Education - An Introduction to the Related Paper Set

Daniela Fiedler, Department of Biology Education, IPN – Leibniz Institute for Science and Mathematics Education, Kiel, Germany

M. Elizabeth Barnes, Department of Biology, Middle Tennessee State University, USA

A 5-year Analysis of the Impact of Religion and Political Views on Acceptance of Evolution (Virtual)

Ryan Dunk, School of Biological Sciences, University of Northern Colorado, USA

Jason R. Wiles, Department of Biology, Syracuse University, USA

Religious Cultural Competence in Evolution Education and its Association with Changes in Student Acceptance of Evolution across the United States

M. Elizabeth Barnes, Department of Biology, Middle Tennessee State University, USA

Hayley Dunlop, Ohio State University Medical School, USA

Julie Roberts, Psychology Department, Northwestern University, USA

K. Supriya, Center for Education Innovation and Learning in the Science, University of California Los Angeles, USA

Sam Maas, School of Life Sciences, Arizona State University, USA

Baylee Edwards, School of Life Sciences, Arizona State University, USA

Yi Zheng, School of Life Sciences, Arizona State University, USA

Sara Brownell, School of Life Sciences, Arizona State University, USA

Evolution Education in Light of the Conception of Religious Science Teachers and Scientists towards Evolution and Religion (Virtual)

Reut Stahi-Hitin, Department of Science Teaching, Weizmann Institute of Science, Rehovot, Israel

Anat Yarden, Department of Science Teaching, Weizmann Institute of Science, Rehovot, Israel

Daniela Fiedler, Department of Biology Education, IPN – Leibniz Institute for Science and Mathematics Education, Kiel, Germany

Sources of Validity Evidence for Evolution Acceptance of Creationists: A Matter of Microevolution and Macroevolution

Anna Beniermann, Department of Biology Education, Humboldt-Universität zu Berlin, Berlin, Germany

Alexandra Moormann, Museum für Naturkunde – Leibniz Institute for Research in Evolution

and Biodiversity, Berlin, Germany

Daniela Fiedler, Department of Biology Education, IPN - Leibniz Institute for Science and Mathematics Education, Kiel, Germany

K. Supriya, Center for Education Innovation and Learning in the Science, University of California Los Angeles, USA

Sam Maas, School of Life Sciences, Arizona State University, USA

Baylee Edwards, School of Life Sciences, Arizona State University, USA

Yi Zheng, School of Life Sciences, Arizona State University, USA

Sara Brownell, School of Life Sciences, Arizona State University, USA

3/29/22

Strand 4: Science Teaching — Middle and High School (Grades 5-12): Characteristics and Strategies

SC-organized paper set-Modelling-based curriculum in secondary classrooms

3:40 PM-5:10 PM

Presider: Stephen L. Thompson, University of South Carolina

Defining a Research Agenda for OpenSciEd Curriculum Materials

Kevin W. McElhaney, Digital Promise

Anthony Baker, Digital Promise

Babe Liberman, The Opportunity Trust

Zareen Kasad, Digital Promise

Carly Chillmon, Digital Promise

Jeremy Roschelle, Digital Promise

Tina Vo, University of Nevada- Las Vegas

Exploring Secondary Students' Explanations And Ideas On Evolution In A Modelling-based Task

Blanca Puig Mauriz, University of Santiago de Compostela

Noa Ageitos Prego,

Teachers' Use and Adaptation of a Model-based Climate Curriculum: A Three-year Longitudinal Study

Kimberly Carroll Steward, University Of Nebraska - Lincoln

Cory T. Forbes, University Of Nebraska–Lincoln

Mark Chandler , NASS GISS LAB/Columbia University

3/29/22

Strand 5: College Science Teaching and Learning (Grades 13-20)

SC-organized paper set-Faculty Perceptions of Instruction and Teaching Professional Development

3:40 PM-5:10 PM

Presider: Emily M. Walter, California State University, Fresno

Development of Multidimensional Framework for Exploring Undergraduates' Conceptions of Studying Science: Student and Faculty Perspectives

Angela N. Google, University of South Alabama

Jeremiah Henning, University of South Alabama

Anna S. Grinath, Idaho State University

Grant E. Gardner, Middle Tennessee State University

Limited or Complete? Conceptions of Teaching and Learning for STEM Teaching vs. Research Faculty

Veronika Rozhenkova, University of California, Irvine

Lauren Snow, University of California, Irvine

Brian Sato, University Of California, Irvine

Natascha Trellinger Buswell, University Of California, Irvine

Managing disruptions and dilemmas in online geoscience instruction during the COVID-19 pandemic (Virtual)

Kathryn M. Bateman, Temple University

Brandin Conrath, The Pennsylvania State University

Joy Ham, Temple University

Ellen Altermatt, Utah Education Policy Center

Anne Egger, Central Washington University

Ellen Iverson, Science Education Resource Center - Carleton College

Cathryn Manduca, Science Education Resource Center - Carleton College

Eric Riggs, Humboldt State University

Kristen St. John, James Madison University

Thomas F Shipley, Temple University

Pedagogical Complexity for Engineering Professors: Learning from a Pilot of the SPARK-ENG Professional Learning Program

Mijung Kim, University of Alberta

Janelle McFeetors, University of Alberta

Kerry Rose, University of Alberta

Qingna Jin, University of Alberta

Sreyasi Biswas,

Jason Carey, University of Alberta

Janice Miller-Young, University of Alberta

Marnie Jamieson, University of Alberta

Samer Adeeb, University of Alberta

3/29/22

Strand 6: Science Learning in Informal Contexts

SC-organized paper set-Leveraging informal learning for formal learning

3:40 PM-5:10 PM

Presider: Lin Li, University of Windsor

Cognitive Load, Transfer, and Instructional Decision Making in Middle School STEM Integration

Angela M. Kelly, Stony Brook University

Monica Bugallo, Stony Brook University

Dioramas as a Place for Play and Early Science Learning: Exploring Teachers' Perspectives and Experiences

Jamie Wallace, American Museum of Natural History

Jenny D. Ingber, American Museum of Natural History

Sue Dale Tunnicliffe, University College London Institute of Education

Navigating Sociocultural Constraints that Influence African American Students' Participation in STEM: Deconstructing STEM Access

Lezly Taylor, Virginia Polytechnic Institute and State University

Brenda R. Brand, Virginia Tech University

George E. Glasson, Virginia Polytechnic Institute and State University

Anza Mitchell, Virginia Tech University

Takumi Sato, Virginia Tech

3/29/22

Strand 7: Pre-service Science Teacher Education

SC-organized paper set- Investigating Relationships between PCK Components

3:40 PM-5:10 PM

President: Jessica Watkins, Vanderbilt University

Influence of pre-service teachers' interactive use of content-specific knowledge components from students' point of view

Olutosin Solomon Akinyemi, University of the Witwatersrand

Adeniran G Adewusi, University of Pretoria

Measuring the effects of scaffolds in a video-based learning environment for pre-service biology teachers

Marie Irmer, Biology Education, LMU Munich

Dagmar Traub, Biology Education, LMU Munich

Maria Kramer, Biology Education, LMU Munich

Christian Förtsch, Biology Education, LMU Munich

Birgit Jana Neuhaus, Biology Education, LMU Munich

Relationships Among Preservice Science Teachers' Discipline-, Domain- and Topic-Specific PCK - An Exploratory Study

Sarah Voss, Drake University

Jerrid W. Kruse, Drake University

Maryann Huey, Drake University

3/29/22

Strand 8: In-service Science Teacher Education

SC-organized paper set-Personal Factors Shaping Teacher Growth

3:40 PM-5:10 PM

President: Vashunda Williams Warren

Defining Teacher Ownership: A Science Education Case Study to Dertarmin Categories of Teacher Ownership

Ana Valdmann, Scientist

Miia Rannikmae, Professor

Jack Holbrook, Professor

Self-regulated Learning Professional Development for Science Teachers: A Systematic Literature Review

Daniel K. Capps, University of Georgia

Hong Tran, UGA

Timothy J. Cleary,

What keeps rural science teachers in rural schools?: Teacher professional resilience

Diane Susan Wright, Colorado State University

Meena M. Balgopal, Colorado State University

A Review of Literature on Professional Learning for Science Teachers of Students with Learning Disabilities in the K-12 Setting

Sahrish S. Panjwani, University of Georgia

3/29/22

Strand 10: Curriculum and Assessment

SC-organized paper set-Methodological approaches to designing science assessment tasks

3:40 PM-5:10 PM

Presider: Zoe E. Buck Bracey, BSCS

Designing for Engineering: A Model for Integrating Engineering and Science NGSS Middle School Benchmark Assessments

Maia K. Binding, UC Berkeley - Lawrence Hall of Science

Lauren Brodsky, The Learning Design Group

Exploring the Comparability of Multiple-Choice and Constructed-Response Versions of Scenario-Based Assessment Tasks

Cari F. Herrmann Abell, BSCS Science Learning

Joseph M. Hardcastle, BSCS

George E. De Boer, American Association for the Advancement Of Science - Project 2061

Mining the Potential of "Wrong Answers" in Item Pairs to Describe Students' Alternative Thinking

Jim A Minstrell, Facet Innovations

Philip Hernandez, Stanford University

Min Li, University Of Washington

Ruth A. Anderson, FACET Innovations, LLC

Maria Araceli Ruiz-Primo, Stanford University

Xiaoming Zhai, University of Georgia

Dongsheng Dong, amazon

Klint Kanopka, Stanford University

Bayesian versus Frequentist Estimation for Item Response Theory (IRT) Models of Interdisciplinary Science Assessment

Hye Sun You, Arkansas Tech University

Seounghun Lee, University of Texas at Austin

3/29/22

Strand 11: Cultural, Social, and Gender Issues

SC-organized paper set-Gender and Sexual Identity Inclusivity in STEM

3:40 PM-5:10 PM

Presider: Katerina Pia Günter, Uppsala University

Don't forget about the LGBTQIA+: Toward a more robust queer theory in science education

Ashley N. Jackson, University Of Michigan

Darrell Allen, University Of Michigan

Education Research Experiences for Pre-Health Students Enhance Clinical Skills and Develop Awareness of LGBTQ+ Microaggressions

Laura A Weingartner, University of Louisville School of Medicine

Emily J Noonan, University of Louisville School of Medicine

M. Ann Shaw, University of Louisville School of Medicine

Linda C. Fuselier, University of Louisville

Supporting Secondary Science Teachers' Awareness of Gender Variance and Creation of Gender-Inclusive Lesson Plans

Stephanie S Eldridge, University of Georgia

Georgia Hodges, University Of Georgia

Gender Atypical? Examining the Gender Identities of Women in Engineering

Ursula Nguyen, The University of Texas at Austin

Catherine Riegler-Crumb, University of Texas

3/29/22

Strand 11: Cultural, Social, and Gender Issues

Related Paper Set-Raciolinguistic Perspectives in Science Education

3:40 PM-5:10 PM

Who gets to sound "like a scientist"? Scientific language as a process of authentication
Quentin C. Sedlacek, Southern Methodist University

Language ideologies in science course materials
Catherine Lemmi, California State University, Chico

Talking beyond science: Deconstructing whiteness and hegemonic language ideologies in preservice science teacher education
Caroline T. Spurgin, UC Santa Cruz
Sara Tolbert, Te Whare Wananga O Waitaha University of Canterbury

Language-as-race: Segregated science education and why it matters for efforts to include 'English learners' today (Virtual)
Kathryn L. Kirchgasser, University of Wisconsin–Madison
Cynthia T. Baeza, University of Wisconsin–Madison

3/29/22

Strand 12: Technology for Teaching, Learning, and Research

SC-organized paper set-Implementing Personalized Digital Platforms to Enhance Student Learning During the Pandemic

3:40 PM-5:10 PM

Presenter: Shane Tutwiler, University of Rhode Island

Learning Analytics in a Designed Learning Platform During the Covid-19 Pandemic

Michael Adelani Adewusi, Lagos State University (ACEITSE), Ojo

Mobile Learning in the Physics Classroom – Should Students Bring or Schools Provide Smartphones? (Virtual)

Daniel Laumann, University of Münster

Malte Ubben, University of Münster

Susanne M. Heinicke, University of Münster

Stefan Heusler, University of Münster

The influence of a personalized online environment for chemistry teaching and learning on students' outcomes

Ehud Aviran, The Weizmann Institute Of Science

Ron Blonder, The Weizmann Institute Of Science

Using an Adaptive Learning System Teaching Engineering Students: Challenges and Opportunities

Frikkie George, Cape Peninsula University of Technology

Keith R. Langenhoven, University Of the Western Cape

Ekaterina Rzyankina, Cape Peninsula University of Technology

3/29/22

Strand 13: History, Philosophy, Sociology, and Nature of Science

SC-organized paper set-Nature of Science in K-12 Education

3:40 PM-5:10 PM

Presider: Dilara Goren, Bogazici University

Middle School Students' Understanding of Nature of Science and Their Metacognitive Awareness

Dilara Goren, Bogazici University

Ebru Kaya, Bogazici University

Structuralist or inferential: Which better helps to understand children comprehension of scientific representations?

Fernando Flores-Camacho, Universidad Nacional Autónoma de México

Leticia Gallegos-Cázares, Universidad Nacional Autónoma de México

Students' Understandings about Nature of Science and Their Argumentation Skills

Rola Khishfe, American University of Beirut

Teaching K12 Engineering — Educator's Views of Practices, Nature, and Knowledge

Brian D Hartman, Walla Walla University

Randy L. Bell, Oregon State University

3/29/22

Strand 15: Policy, Reform, and Program Evaluation

Related Paper Set-Supporting Expansive Conceptions of Science Teaching and Learning for Equity

3:40 PM-5:10 PM

Discussant: Tiffany Neill, Oklahoma State Department of Education

President: Maya Garcia, Colorado Department of Education

Design Principles, Change Theory, and Infrastructuring Needs for Implementation

Abby Rhinehart, University of Washington

Deb L. Morrison, University Of Washington

Philip L. Bell, University Of Washington

Maya Garcia, Colorado Department of Education

Tiffany Neill, Oklahoma State Department of Education

Science Education Leaders' Sense-making and Noticing for Equity

Riley Ceperich, University of California LA

Trang Tran, University of Colorado Boulder

Yamileth Salinas Del Val, University of Colorado Boulder

Kristen Davidson, University of Colorado Boulder

A Landscape Survey Analysis of the Potential for Equity-focused Science Education across the PK-12 Education System

Philip L. Bell, University Of Washington

Abby Rhinehart, University of Washington Seattle

Melissa Campanella, University of Colorado Boulder

Supporting Science Teachers in Using Student Experience Data to Support More Equitable Participation in Science Classrooms

Ali Raza, University of Colorado Boulder

William R. Penuel, University of Colorado Boulder

Yamileth Salinas Del Val, University of Colorado Boulder

3/29/22

Research Committee

Admin Symposium-How to Get Your Research Published in Science Education Journals

3:40 PM-5:10 PM

Organizers

Saouma B. Boujaoude, American University Of Beirut

Dante Cisterna, Educational Testing Service

Ibrahim H. Yeter, National Institute of Education, Nanyang Technological University

Participating Journals

Journal of Research in Science Teaching (JRST)

Felicia Mensah, Columbia University

Troy Sadler, University of North Carolina Chapel Hill

Science Education

Sherry Southerland, Florida State University

John Settlage, University of Connecticut

School Science and Mathematics (SSM),

Bridget Miller, University of South Carolina

Christie Martin, University of South Carolina

Journal of Science Teacher Education (JSTE)

Geeta Verma, University of Colorado, Denver

Todd Campbell, University of Connecticut

Wayne Melville, Lakehead University

Journal of Science Education and Technology (JSET),

Kent Crippen, University of Florida

Studies in Science Education (SSE)

Lucy Avraamidou, University of Groningen

Justin Dillon, University of Exeter

Science and Education,

Sibel Erduran, Oxford University

Cultural Studies of Science Education

Catherine Milne, New York University

Christina Siry, University of Luxembourg

International Journal of Science Education (IJSE)

Gail Jones, North Carolina State University

Jan van Driel, The University of Melbourne

Research in Science Education (RSE)

Angela Fitzgerald, University of southern Queensland;

Kim Nichols, University of Queensland

Computers and Education

Rachelle S. Heller, George Washington University

Journal of the Learning Sciences

A. Susan Jurow, University of Colorado, Boulder, USA

Jianwei Zhang, University at Albany, State University of New York, USA

Canadian Journal of Science, Mathematics and Technology Education

Doug McDougall, OISE, University of Toronto, Canada

Asia-Pacific Science Education

Sonya Martin; Seoul National University

CBE-Life Science Education

Kimberly Tanner; San Francisco State University

Jeff Schinske, Foothill College

3/29/22

Awards Committee

Admin Symposium-A Celebration of NARST Award Recipients: A Discussion of the Future of Science Education, Session 1

3:40 PM-5:10 PM

President: Noemi Waight, University at Buffalo

Distinguished Contributions to Research Award (DCRA)

Noemi Waight, University at Buffalo

Marissa S. Rollnick, Wits University

Katherine L. McNeill, Boston College

Dana Vedder-Weiss, Ben-Gurion University Of the Negev, Israel

Jomo Mutegi, Old Dominion University

INSERT AWARDEES HERE

3/29/22

Strand 1: Science Learning: Development of student understanding

SC-organized paper set-Inscriptions in Science Learning

5:20 PM-6:50 PM

Presenter: Cesar Delgado, North Carolina State University

A novel method for measuring problem-definition progression of middle schoolers: Use of student artifacts 1

Ferah Ozer, The University of North Carolina at Chapel Hill

Nihal Dogan, Bolu Abant Izzet Baysal University

Narrowing the Gap Between Experiments, Texts and Pictures – Investigation of an Extended Contiguity Principle

Paul Schlummer, Institute of Physics Education (IDP) at the University of Münster

Stefan Heusler, Institute of Physics Education (IDP) at the University of Münster

Daniel Laumann, Institute of Physics Education (IDP) at the University of Münster

Science Notebooks in Preschool Education

Elena Calderón-Canales, Instituto de Ciencias Aplicadas y Tecnología, Universidad Nacional Autónoma de México.

Leticia Gallegos-Cázares, Instituto de Ciencias Aplicadas y Tecnología, Universidad Nacional Autónoma de México.

Fernando Flores-Camacho, Instituto de Ciencias Aplicadas y Tecnología, Universidad Nacional Autónoma de México.

Students' Sensemaking Related to Mathematical Equations in A Biology Classroom (Virtual)

Desi, University of Minnesota

Cuc Vu,

Gillian Roehrig, University of Minnesota

Anita Schuchardt, University of Minnesota

3/29/22

Strand 2: Science Learning: Contexts, Characteristics and Interactions

SC-organized paper set-Early Childhood & Elementary Science Teaching & Learning

5:20 PM-6:50 PM

President: Amy V. Farris, Penn State

Australian Primary School Students' Understandings about the Nature of Scientific Inquiry

Patricia D Morrell, The University of Queensland

Jana Visnovska, The University of Queensland

Jodie Miller, The University of Queensland

Elementary Teachers' Agency for Teaching Science and Engineering when Working Within and Against School Structures

Alison Mercier, University of Wyoming

Using Photovoice to Understand Children's Experiences and Environmental Science Learning at a Nature Preschool

Laura Dell, University of Cincinnati

Using the Scientific and Engineering Practices Observation Protocol (SciEPOP) to Explore Play-based Early Learning Environments

Alison R. Miller, Bowdoin College

Lauren P. Saenz, Bowdoin College

3/29/22

Strand 3: Science Teaching — Primary School (Grades preK-6): Characteristics and Strategies

Admin Symposium-Enhancing Science and Engineering in Preschool through Fifth Grade: A National Academies Consensus Study

5:20 PM-6:50 PM

Enhancing Science and Engineering in Preschool through Fifth Grade: A National Academies Consensus Study

Elizabeth A. Davis, University of Michigan

Amy Stephens, National Academies of Sciences, Engineering, and Medicine

Heidi B. Carlone, Vanderbilt University

Eve Manz, Boston University School of Education

Carrie Tzou, University of Washington Bothell

Carla Zembal-Saul, Penn State University

Lucy Avraamidou, University Of Groningen

Tia C. Madkins, The University of Texas At Austin

Felicia M. Mensah, Teachers College, Columbia University

3/29/22

Strand 4: Science Teaching — Middle and High School (Grades 5-12): Characteristics and Strategies

SC-organized paper set-Pedagogical content knowledge for secondary science teachers

5:20 PM-6:50 PM

Presider: Andrea Moeller, University of Vienna

Investigating a Chemistry Teacher's modeling-PCK in the Periodic Table Modeling-Based Instruction

Ya-Ping Tsao, National Taiwan Normal University Graduate Institute of Science Education

Mei-Hung Chiu, National Taiwan Normal University Graduate Institute of Science Education

Mao-Ren Zeng, National Taiwan Normal University Graduate Institute of Science Education

Yen-Tzu Liao, National Taiwan Normal University Graduate Institute of Science Education

Sin-Yun Syu, National Taiwan Normal University Graduate Institute of Science Education

Li-Ya Wang, National Taiwan Normal University Graduate Institute of Science Education

Pre-Service Biology Teachers' PCK about Scientific Reasoning (Virtual)

Leroy Großmann, Freie Universität Berlin

Merryn Dawborn-Gundlach, University of Melbourne

Jan H. Van Driel, University Of Melbourne

Dirk Krüger, Freie Universität Berlin

Moritz Krell, Leibniz Institute for Science and Mathematics Education (IPN)

THE IMPACT OF ASSESSMENT CHANGE ON TEACHERS' ORIENTATIONS AND PCK FOR HIGH SCHOOL LABORATORY PRACTICES

Vanessa Kind, Durham University

Helen Cramman, Durham University

Helen F Gray, Durham University

THE TOPIC SPECIFIC PCK OF VIDEOS ON THE BIG IDEA, "WHAT IS CHEMICAL EQUILIBRIUM"

Marissa S. Rollnick, Wits University

Stephen A. Malcolm, University of the Witwatersrand

3/29/22

Strand 5: College Science Teaching and Learning (Grades 13-20)

SC-organized paper set-Learning About Science, Engineering and Social Issues

5:20 PM-6:50 PM

President: Catherine Mary Kenyon, Clemson University

College Students' Epistemological Beliefs about Medical Science and Trust in Science and Scientists during COVID-19

Lisa A. Borgerding, Kent State University

Bridget K. Mulvey, Kent State University

Engineering students' self-efficacy and civic responsibility in a social innovation curriculum

Tiffanyrose Sikorski, George Washington University

Erica Wortham, George Washington University

Investigating graduate student and instructors' course experiences "Teaching and Learning Science for Social Justice"

Iesha Jackson, University of Nevada- Las Vegas

Tina Vo, University of Nevada- Las Vegas

Sabrina Barakat, UNLV

Nicole J. Thomas, University of Nevada, Las Vegas

Sarah York, UNLV

Abigale Ly, UNLV

Utilizing argument-driven inquiry with scaffolding to improve socioscientific argumentation in undergraduate students

Sarah Krejci, Bethune-Cookman University

Hector N Torres, Bethune-Cookman University

Raphael D Isokpehi, Bethune-Cookman University

Dana L Zeidler, University of South Florida

3/29/22

Strand 7: Pre-service Science Teacher Education

SC-organized paper set-Creating spaces and resources for high quality learning in pre-service teacher education

5:20 PM-6:50 PM

President: Elizabeth B. Lewis, University Of Nebraska–Lincoln

Examining Virtual Rehearsals and Practice Science Teaching as Support Systems for Rural Elementary Teacher Residents

Stephen L. Thompson, University of South Carolina

Amber Adgerson, University of South Carolina

Finding high-quality mentor feedback for science pre-service teachers

Caroline Hadley Long, University of Washington

Mark Windschitl, University Of Washington

Karin Lohwasser, University of California, Santa Barbara

Soo-Yean Shim, University of Illinois

Tammy Q. Tasker, Western Washington University

Learning to Teach During a Pandemic: Preservice Secondary Science and Mathematics Teachers' Use of Resources

Matthew D. Bennett, University of California, Santa Barbara

Valerie Valdez, University of California, Santa Barbara

Cameron Dexter-Torti, University of California, Santa Barbara

Donald McNish, University of California, Santa Barbara

Liliana Garcia, University of California, Santa Barbara

T. Royce Olarte, University of California, Santa Barbara

Sarah Hough, University of California, Santa Barbara

Sarah A. Roberts, University of California, Santa Barbara

Julie A. Bianchini, University of California, Santa Barbara

3/29/22

Strand 7: Pre-service Science Teacher Education

SC-organized paper set-Toward inclusive and just outcomes for diverse learners

5:20 PM-6:50 PM

President: Karl G. Jung, University Of South Florida

Challenges with Inclusive Teaching at Vocational Schools in Germany

Simone Rueckert, University of Duisburg-Essen

Helena Van Vorst, University of Duisburg-Essen

Cultivating Discourse of English Learners During the Enactment of Cognitively Demanding Work

Walter Aminger, University Of California, Santa Barbara Nevada State College

Preservice Teacher Noticing, Interpreting, Responding to Students' Sensemaking Resources for Equitable Access to Science Understanding

Judith A. Cooper-Wagoner, University of Arizona

Kristin L. Gunckel, University Of Arizona

The Paradox of Dedication: Agonistic interviews on preservice science teacher students' choice-narratives

Jeppe Langkjær, University College Copenhagen

Bjørn Friis Johannsen, University College Copenhagen

Maria Rejkjær Holmen, University College Copenhagen

3/29/22

Strand 8: In-service Science Teacher Education

SC-organized paper set-Teacher Learning and Practice during the Pandemic

5:20 PM-6:50 PM

President: Jennifer Maguire, Virginia Tech

Exploring Teachers' Experience and Implementation of the Science and Engineering Practices in Different Instructional Contexts

Cheng-Wen He, University of Georgia

Hong H. Tran, UGA

Yamil Ruiz,

Shaugnessy McCann,

Brooke A. Whitworth, Clemson University

Julie A. Luft, University of Georgia

Identification and characterization of the essential knowledge domains for online chemistry teaching during Covid-19 pandemic

Itsik Aroch, The Weizmann Institute of Science

Dvora Katchevich, The Weizmann Institute Of Science

Lili Orland?Barak, University of Haifa

Ron Blonder, The Weizmann Institute Of Science

The Experiences of Biology Teacher Coordinators Participating in a VPLC During the COVID-19 Crisis (Virtual)

Odelia Schrire, Technion

Dina Tsybulsky, Technion - Israel Institute Of Technology

Christine Ipsen, DTU

The role of professional learning communities (PLCs) in supporting chemistry teachers during the COVID-19 crisis

Anat Shauly,

Gabriella Shwartz, Dr.

Shirly Avargil, Dr.

3/29/22

Strand 10: Curriculum and Assessment

SC-organized paper set-Teacher collaborative design of three-dimensional performance assessments

5:20 PM-6:50 PM

President: Joi Merritt, James Madison University

CoFee – Computer-based feedback design for written reflections in pre-service science teacher education

Peter Wulff, University of Potsdam

Lukas Mientus, University of Potsdam

Anna Nowak, University of Potsdam

Andreas Borowski, University of Potsdam

Examining the impact of using pilot data to support teachers in designing high quality three-dimensional performance assessments

Cathy Zozakiewicz, SNAP/SCALE

Jill A. Wertheim, Stanford University

Supporting Teachers' Capacity to Design for Coherent Assessment of Multidimensional Science Learning

Samuel Severance, University of California, Santa Cruz

Guadalupe Martinez, University of California, Santa Cruz

Teacher Agency in a Responsive Co-Design Process of 3D Performance Assessments

Jill Wertheim, Stanford Center for Assessment, Learning, and Equity (SCALE)

Miray Tekkumru Kisa, Florida State University

Ozlem Akcil Okan, Florida State University

3/29/22

Strand 11: Cultural, Social, and Gender Issues

SC-organized paper set-Innovation in Conceptual and Methodological Research Approaches

5:20 PM-6:50 PM

Presider: John Settlage, UConn

Art-based Methods and Signs of Science Capital: Approaching Young Children's Experiences and Relation to Science

Katia Bill Nielsen, University of Copenhagen

Ene Ernst Hoppe, University of Copenhagen

Henriette T. Holmegaard, University Of Copenhagen

Ethnodance as a Critical Identity Tool for Black Students' Science Identity Construction

Mindy J. Chappell, University of Illinois at Chicago

Patchworking Critical and Cultural-Historical Activity Theoretical Analytics for Research in Science Education

Caroline T. Spurgin, UC Santa Cruz

Alexandra I. Race, UC Santa Cruz

Doris B. Ash, University of California Santa CruzC Santa Cruz

Inclusive Science Education: Sheltered Instruction for English Language Learner

Hajira Nusret,

Saiqa Azam, Memorial University Of Newfoundland

3/29/22

Strand 12: Technology for Teaching, Learning, and Research

SC-organized paper set-Multimedia, Artificial Intelligence, and Augmented Reality in Teaching and Learning

5:20 PM-6:50 PM

President: Cristian Merino, Pontificia Universidad Católica De Valparaíso

A Bibliometric Analysis of Trends and Issues in Educational AI

Brian Abramowitz , University of Florida

Minyoung Lee, University of Florida

Pavlo Antonenko, University of Florida

An Eye-Tracking Study On Learning Representations In Organic Chemistry With Dynamic Signals In Instructional Videos

Marc Rodemer, IPN - Leibniz Institute for Science and Mathematics Education

Marlit A. Lindner, IPN - Leibniz Institute for Science and Mathematics Education

Julia Eckhard, Justus-Liebig-University Giessen

Nicole Graulich, Justus-Liebig Universität Giessen

Sascha Bernholt, IPN - Leibniz Institute for Science and Mathematics Education

Exploring Teachers' Conceptions of Artificial Intelligence in K-12 Science Education

Brian Abramowitz, University of Florida

Pavlo D. Antonenko, University Of Florida

Stephanie Killingsworth, University of Florida

Bruce MacFadden, University of Florida

Sadie Mills, University of Florida

Topic specific differences in supporting organic chemistry learning augmented reality based

Sebastian Keller, University of Duisburg-Essen

Sebastian Habig, FAU Erlangen-Nürnberg

Stefan Rumann, University Of Duisburg-Essen

3/29/22

Strand 13: History, Philosophy, Sociology, and Nature of Science

SC-organized paper set-Nature of Science in Teacher Education

5:20 PM-6:50 PM

Presider: Wonyong Park, University of Southampton

"It's a lesson with no answer!": Understanding preservice teachers' lesson development using history of science (Virtual)

Wonyong Park, University of Southampton

Sibel Erduran, University of Oxford

Jinwoong Song, Seoul National University

Minchul Kim, Kongju National University

What is Physics? Considering Teachers' Epistemic Beliefs about Physics Knowledge

Ellen Watson, Brandon University

Teaching of NOSI in Outdoor Learning Environments in the Period of Covid-19 Pandemic (Virtual)

Gunkut Mesci, Giresun University

Eda Erdas Kartal, Kastamonu University

Pre-Service Chemistry Teacher's Beliefs regarding the use of Experiments and Nature of Science

Janne-Marie Bothor, University of Kassel

David S. Di Fuccia, University of Kassel

3/29/22

Strand 15: Policy, Reform, and Program Evaluation

SC-organized paper set-Standards

5:20 PM-6:50 PM

President: Kathryn M. Bateman, Temple University

Developing a Framework for Identifying Key Innovations in Novel Science Programs: A Learning-by-Making Case Study

Benjamin S Mahrer, WestEd

Gary Weiser, WestEd

Linlin Li, WestEd

Laura Peticolas, Sonoma State University

Lynn Cominsky, Sonoma State University

Searching for Nature of Engineering in the Framework for K-12 Science Education

Hasan Deniz, University of Nevada Las Vegas

Erdogan Kaya, George Mason University

Ezgi Yesilyurt, Weber State University

Private Industry's Push and Pull: Is Computer Science Really for All?

Stefanie L. Marshall, University of Minnesota- Twin Cities

Ain Grooms, University of Iowa

Social Covenants as Contextual Mitigating Factors (CMFs)

Katie L Brkich, Georgia Southern University

Alejandro J. Gallard, Georgia Southern University

Wesley Pitts, Lehman College, CUNY

S. Lizette Ramos, University of Guadalajara

Maria A Rodriguez, University of Texas Rio Grande Valley

3/29/22

Awards Committee

Admin Symposium-A Celebration of NARST Award Recipients: A Discussion of the Future of Science Education, Session 2

5:20 PM-6:50 PM

Presider: Noemi Waight, University at Buffalo

Early Career Research Award (ECRA), Outstanding Dissertation Research Award (ODRA), and NARST Fellows Award

Noemi Waight, University at Buffalo

Katherine L. McNeill, Boston College

Dana Vedder-Weiss, Ben-Gurion University Of the Negev, Israel

Jomo Mutegi, Old Dominion University

INSERT AWARDEES HERE

3/29/22

Research Committee

***Admin Symposium-Supporting and Advancing Science Education Research Practice through
Community Discussions***

5:20 PM-6:50 PM

*Supporting and Advancing Science Education Research Practice through Community
Discussions*

Stanley M. Lo, University of California San Diego

Francesca A. Williamson, Indiana University School of Medicine

Glenn R. Dolphin, Syracuse University

Joe Taylor, University of Colorado Colorado Springs

Scott Cohen, Georgia State University

Jordan L. Henley, University of Georgia

Mohammed Estaiteyeh, Western University

Theila Smith, University of Groningen

Robert M. Talbot, University of Colorado Denver

3/30/22

Strand 1: Science Learning: Development of student understanding

SC-organized paper set-Students' Conceptual Development

8:45 AM-10:15 AM

Presider: Jenny M. Dauer, University Of Nebraska–Lincoln

Certain about uncertainty: quality of students' justifications in comparing data sets

Karel Kok, Humboldt-University

Burkhard Priemer, Humboldt-University

Constructing Science Concept Development: How Design Artifact Changes Reveal Mental Model Changes in Young Children

Christine McGrail, University of Massachusetts Amherst

Jeanne Brunner, University of Massachusetts Amherst

Martina Nieswandt, University of Massachusetts Amherst

How different approaches to science teaching influence vertical knowledge-linking within the concept of energy

Dennis Dietz, Freie Universität Berlin

Claus Bolte, Freie Universtaet Berlin

3/30/22

Strand 2: Science Learning: Contexts, Characteristics and Interactions

SC-organized paper set-Equity & Social Justice in Science Teaching & Learning

8:45 AM-10:15 AM

President: Tammy M. Long, Michigan State University

A Case for Humane Genetics Education: How Students Used Genetics Knowledge to Argue About a Racial Disparity

Dennis M. Lee, BSCS Learning Sciences

Brian M. Donovan, BSCS

Monica Weindling, BSCS Science Learning

Awais Syed, BSCS Science Learning

Equity Considerations in Earth Science Out-of-Field Teaching and Student Performance (Virtual)

Christine P. Schlendorf,

Angela M. Kelly,

Robert Krakehl,

Multimodal revoicing: Embodied student resources to support students' explanations of science phenomena

Samuel Lee, Boston College

Kevin Cherbow, Florida State University

Katherine L. McNeill, Boston College

Toward a community of civic practice: a case study on service-based experiential learning in support of community driven science engagement

John R. Ruppert, Saint Peter's University

Jennifer Ayala, Saint Peter's University

Yosra Badiei, Saint Peter's University

Masiel C. Infante, Saint Peter's University

Jeanette Wilmanski, Saint Peter's University

Towards an Inclusion of All in Lab Courses – The Case of a Blind Student

Stefanie Lenzer, Institute for Science Education, Leibniz University Hannover

Marvin Roski, Institute for Science Education, Leibniz University Hannover

Andreas Nehring, Institute for Science Education, Leibniz University Hannover

3/30/22

Strand 3: Science Teaching — Primary School (Grades preK-6): Characteristics and Strategies

Related Paper Set-Elementary Preservice Teachers Learning to Support Equitable Sensemaking

8:45 AM-10:15 AM

Discussant: Okhee Lee, New York University

Elementary Preservice Teachers Investigating Local Phenomena and Problems: Envisioning Opportunities for Equitable Student Sensemaking

Anna Maria Arias, Kennesaw State University

Jessica Stephenson Reaves, Kennesaw State University

An Exploration of Learning Science Subject Matter Knowledge Through Teaching in a Methods Course

Ryan Nixon, Brigham Young University

Sarah J. Fick, Washington State University

Preservice Elementary Teachers' Recognition of Resources Students Bring to Science Learning

Sarah J. Fick, Washington State University

Stephany RunningHawk Johnson, Washington State University

Preservice Elementary Teachers Noticing Features of Classroom Instruction that Support Equitable Sensemaking

Amanda Benedict-Chambers, Missouri State University

Carrie-Anne Sherwood, Southern Connecticut State University

Okhee Lee, New York University

3/30/22

Strand 4: Science Teaching — Middle and High School (Grades 5-12): Characteristics and Strategies

SC-organized paper set-Secondary science teachers' learning and noticing of student thinking

8:45 AM-10:15 AM

Presider: Todd L. Hutner, The University of Alabama

An Exploratory Study of the Epistemic Goals of a First-Year Science Teacher

Todd L. Hutner, The University of Alabama

Beyond Excellence In Science Teaching Practice: Virtuosity In Science Teaching And Developing Virtuoso Teachers

Emrah Ozyurek,

Teacher noticing for epistemic agency: What cues teachers to open up space for student sensemaking?

Stina Krist, University of Illinois at Urbana-Champaign

Nitasha Mathayas, Indiana University

Soo-Yean Shim, University of Illinois

Susan B. Kelly, California State University Chico

Dan Voss, Dallas Center-Grimes High School

Nessrine Machaka, University of Illinois At Urbana - Champaign

Elizabeth B. Dyer, University of Tennessee, Knoxville

What Beginning and Experienced Secondary Science Teachers Notice in Videos of Classroom Instruction

Julie A. Luft, University of Georgia

Yuxi Huang, University of Georgia

Shelby Watson, Center for Mathematics and Science Education

Harleen Singh, University of Georgia

Hatice Ozen Tasdemir, The University of Georgia

Brooke A. Whitworth, Clemson University

Yamil Ruiz, Clemson University

Hong Tran, UGA

Shaugnessy McCann, University of Georgia

Cheng-Wen He, University of Georgia

3/30/22

Strand 5: College Science Teaching and Learning (Grades 13-20)

SC-organized paper set-Student Learning in Remote Contexts: Labs and Research

8:45 AM-10:15 AM

President: Wanja Gitari, University of Toronto

A Meta-Study of Science Laboratories at a Distance

Mercy Ogunsola-Bandele, National Open University Of Nigeria

Dietmar Kennepohl, Athabasca University, Canada

Student Perspectives of Remote Participation in Authentic Research in an Undergraduate Ecology Laboratory Course

Stephen R. Burgin, University Of Arkansas

Adam M Siepielski, University of Arkansas

The Impact of Online STEM Teaching and Learning During COVID-19 on Underrepresented College Students' Self-Efficacy and Motivation (Virtual)

Sami Kahn, Princeton University

Janet Vertesi, Princeton University

The Varied Student Experience with Transitioning to Mandatory Online Chem Lab

Joseph V Watts, University of Florida

Corey A. Payne, University Of Florida

Kent J. Crippen, University of Florida

Lorelie Imperial, University of Florida

Melanie Veige, University of Florida

3/30/22

Strand 6: Science Learning in Informal Contexts

Symposium-Innovative approaches to theorizing and studying family STEM learning

8:45 AM-10:15 AM

Discussant: Tali Tal, Technion

Presider: Neta Shaby, Ben Gurion University of the Negev

Innovative approaches to theorizing and studying family STEM learning

Neta Shaby, Ben Gurion University of the Negev

Dana Vedder-Weiss, Ben-Gurion University Of the Negev, Israel

Scott A. Pattison, TERC

Smirla Ramos-Montañez, TERC

Irit Vivante, Ben Gurion University

Lucy R. McClain, Pennsylvania State University

Adam V. Maltese, Indiana University

Amber Simpson, Indiana University

Tali Tal, Technion

3/30/22

Strand 7: Pre-service Science Teacher Education

SC-organized paper set-Tools for Assessment in Preservice teacher learning

8:45 AM-10:15 AM

Presider: Peter Wulff, University of Potsdam

An Evaluation Proposal for Pre-Service Primary Teachers: Self-Regulation of Learning and Emotions

Francisco José Castillo Hernández, University of Almeria

María Rut Jiménez Liso, University of Almeria

María Martínez Chico, University of Almeria

Rafael López-Gay, University of ALmeri

Are Knowledge and Acceptance of Evolution Aligned among Jewish Religious Preservice Science Teachers? (Virtual)

Merav Siani, Weizmann Institute of Science Herzog College

Anat Yarden, Weizmann Institute Of Science

Investigating Pre-service Science Teachers' Modeling Metaknowledge with Open-Ended Questions and Diagrams

Paul Engelschalt, Humboldt-Universität zu Berlin

Tom Bielik, Freie Universität Berlin

Moritz Krell, IPN - Leibniz Institute for Science and Mathematics Education, Kiel, Germany

Dirk Krüger, Freie Universität Berlin

Annette Upmeier Zu Belzen, Humboldt-Universität zu Berlin

3/30/22

Strand 8: In-service Science Teacher Education

SC-organized paper set-Teachers Working towards Inclusive Classrooms

8:45 AM-10:15 AM

Presider: Emily J. Perry, Sheffield Hallam University

"I wanted to break the pencil": The Teacher's Role in Reframing Moments of Epistemic Vexation

Claudia Hagan, Georgia State University

Sierra L. Morandi, Florida State University

Victor Kásper, Florida State University

Sherry A. Southerland, Florida State University

Exploring How Engineering Instruction Supports Culturally Relevant Teaching Practices

Amanda M. Gunning, Mercy College

Meghan E. Marrero, Mercy College

Kristen V. Larson, Mercy College

The Interplay Between Scientific Evidence, Diversity and Dialogic Pedagogy

Nasser Mansour, Qatar University

Using Redirections to Examine Responsiveness to Student Thinking in Secondary Science Classrooms

Lauren N. Emery, San Diego State University

3/30/22

Strand 10: Curriculum and Assessment

Symposium-AI-Based Innovative Assessments in Science

8:45 AM-10:15 AM

Discussant: Joseph Krajcik, Michigan State University

President: Xiaoming Zhai, University of Georgia

AI-Based Innovative Assessments in Science

Xiaoming Zhai, University of Georgia

Joseph S. Krajcik, Michigan State University

Knut Neumann, Leibniz Institute for Science Education (IPN) Kiel

Holly Amerman, University of Georgia

Changzhao Wang,

Marcus Kubsch, IPN - Leibniz Institute for Science and Mathematics Education

Mei-Hung Chiu, National Taiwan Normal University

AUSTIN HEIL, University of Georgia

Gary Weiser, WestEd

Ji Shen, University Of Miami

3/30/22

Strand 11: Cultural, Social, and Gender Issues

SC-organized paper set-Resistance and Resilience of Black Women and Black Students

8:45 AM-10:15 AM

President: Katherine Wade-Jaimes, University of Nevada

"Radical Openness and Possibility": Black Women's Resistance Strategies to the Oppressive Culture of STEM

Ekaete Udoh, University of Missouri

Michele Williams, University of Missouri

Terrell R. Morton, University of Missouri - Columbia

Counterstories of Black Women About What it Means to be a STEM Person

Amal Ibourk, Florida State University

Roxanne M. Hughes, Center for Integrating Research and Learning, NHMFL / FL State University

Lauren Wagner, Florida State University

Good Trouble: Interrogating the Definition of Black Resilience in STEM Education

Takeshia Pierre, University of Florida

Creating an Experience of Belonging Within Science: Exploring Science Identity Development in a Counterspace

Ivanna Pengelley, Florida State University

Amal Ibourk, Florida State University

Roxanne M. Hughes, Center for Integrating Research and Learning, NHMFL / FL State University

3/30/22

Strand 12: Technology for Teaching, Learning, and Research

SC-organized paper set-Reinforcing and understanding effective instructional methods

8:45 AM-10:15 AM

President: Phillip A. Boda, University of Illinois At Chicago

Advancing Teachers' Geospatial TPACK: Three Universities' Professional Development Initiatives

Kate Popejoy, Popejoy STEM, LLC

Thomas Hammond, Lehigh University

Alec M. Bodzin, Lehigh University

Judith A. Morrison, Washington State University

Molly H. Weinburgh, Texas Christian University

Electrifying STEM Experiences Through Hybrid Teacher Professional Development (Virtual)

Erik J. Schettig, North Carolina State University

Tamecia R. Jones, North Carolina State University

Applying novel methods to characterize an online, science-based affinity space

Lisa Lundgren, Utah State University

Richard T. Bex, University of Florida

Emily Slater, Utah State University

Jennifer E. Bauer, University of Michigan Museum of Paleontology

Adriane R. Lam, Binghamton University SUNY

A. McKenzie Sonderegger, Utah State University

A Systematic Literature Review on the Use of Social Network Analysis in Discourse Studies

Brock Couch, Middle Tennessee State University

Grant E. Gardner, Middle Tennessee State University

3/30/22

Strand 14: Environmental Education and Sustainability

Related Paper Set-Modelling, Assessment, and Promotion of Climate Literacy

8:45 AM-10:15 AM

President: Ute Harms, IPN - Leibniz Institute for Science and Mathematics Education

Modelling and Assessing Climate Literacy – Development and Implementation of a Knowledge-in-Use Assessment Instrument

Hanno Michel, IPN - Leibniz Institute for Science and Mathematics Education

Ute Harms, IPN - Leibniz Institute for Science and Mathematics Education

Factors that Influence Learners' Climate Literacy and Conceptions of Climate Change

Nathan A. Quarderer, CIRES; Earth Lab University of Colorado Boulder

The Role of Risk Perception for Students' Climate-Friendly Intentions to Act

Carola Garrecht, IPN - Leibniz Institute for Science and Mathematics Education

Nina Christenson, Karlstad University

Ute Harms, IPN - Leibniz Institute for Science and Mathematics Education

Climate Literacy: What do teachers need to know? – A Delphi Study (Virtual)

Kathryn Leve, IPN - Leibniz Institute for Science and Mathematics Education

Ute Harms, IPN - Leibniz Institute for Science and Mathematics Education

3/30/22

Strand 15: Policy, Reform, and Program Evaluation

SC-organized paper set-Teachers and Training

8:45 AM-10:15 AM

President: Emily A. Dare, Florida International University

Campus Association as a Predictor of Science Standard Evaluation using Multinomial Logistic Regression

Allison M. Esparza, Texas A&M University

Science Teachers Who Stay: Factors Contributing to Teacher Retention

Dorothy Holley, West Johnston High School

Soonhye Park, North Carolina State University

STEM Professionals in the Classroom and Elementary Teachers' Content Knowledge

Joanne K. Olson, Texas A&M University

Syahrul Amin, Texas A&M University

Jacob Pleasants, University of Oklahoma

The development and validation of the graduate student success survey: A quantitative study

Karen Marie Collier, North Carolina

Margaret R. Blanchard, NC State University

3/30/22

International Committee

Admin Symposium-Science Education during the COVID-19 Pandemic

8:45 AM-10:15 AM

Science Education during the COVID-19 Pandemic

Sonya N. Martin, Seoul National University

Mauricio Pietrocola, University of Sao Paulo, Brazil

Ernani Vassoler Rodrigues, Federal University of Espírito Santo, Brazil

Samuel M. Schnorr, Federal University of Rio de Janeiro, Brazil

Julie Nonnekens, University Medical Center Rotterdam, Netherlands

Saouma B. Boujaoude, American University Of Beirut, Lebanon

Savannah Graham, Texas Christian University, USA

Olivia Levrini, Alma Mater Studiorum, University of Bologna, Italy

Hayat Hokayam, Texas Christian University

Matthew Johnson, Pennsylvania State University, USA

3/30/22

Equity And Ethics Committee

Admin Symposium-The intersections of 'displacement' and science education: Perspectives across international contexts

8:45 AM-10:15 AM

Discussant: Bhaskar Upadhyay, University of Minnesota

Organizers

Sara Salloum, University of Balamand

Justina A. Ogado, Baylor University

María González-Howard, University of Texas at Austin

Bhaskar Upadhyay, University of Minnesota

Panelists

Alejandro Gallard, Georgia Southern University, USA

Maha Shuyab, Centre for Lebanese Studies at the Lebanese American University, Lebanon

Christine McDonald, Griffith University, Australia

Geeta Verma, University of Colorado Denver, USA

Minjung Ryu, University of Illinois-Chicago, USA

3/30/22

Strand 1: Science Learning: Development of student understanding

SC-organized paper set-Students' Reasoning

10:30 AM-12:00 PM

Presenter: Jonathon Grooms, George Washington University

6th-graders' decision-making and informal reasoning about de-extinction

Nannan Fan, University of North Carolina at Chapel Hill

Collaborative drawing to enable and enact reasoning-in-action.

Vanessa De Andrade, Institute of Education of University of Lisbon

Yael Shwartz, The Weizmann Institute Of Science

Sofia Freire, Institute of Education of University of Lisbon

Mónica Baptista, Instituto De Educação Da Educação Da Universidade De Lisboa

High School Students' Reasoning about the Immune System in Beirut, Lebanon

Ihsan Ghazal, Texas Christian University

Hayat Alhokayem, Texas Christian University

Using Hurricane Resilience to Foster the Development of Student Understanding of Ecosystems in Puerto Rico

Steven Mcgee, The Learning Partnership

Randi McGee-Tekula, The Learning Partnership

Noelia Baez Rodriguez, University of Puerto Rico

3/30/22

Strand 2: Science Learning: Contexts, Characteristics and Interactions

Symposium-Teacher change of practice during Project-based science learning enactment: Case studies across diverse contexts.

10:30 AM-12:00 PM

Discussant: Samuel Severance, University of California, Santa Cruz

President: Joseph S. Krajcik, Michigan State University

Teacher change of practice during Project-based science learning enactment: Case studies across diverse contexts.

Miranda S. Fitzgerald, University of North Carolina At Charlotte

Tingting Li, CREATE for STEM Institute

Cory Susanne Miller, Michigan State University

Emily C. Adah Miller, University of Wisconsin Madison

Selin Akgun,

Katy Easley, University of Michigan

Joseph S. Krajcik, Michigan State University

Samuel Severance, University of California, Santa Cruz

Susan K. Codere, MSU CREATE for STEM

3/30/22

Strand 2: Science Learning: Contexts, Characteristics and Interactions

SC-organized paper set-Instructional & Curricular Approaches in Science Teaching & Learning

10:30 AM-12:00 PM

Presider: Jessica Watkins, Vanderbilt University

Pedagogical Moves That Support Coordinating Communication and Co-Authorship in a Multilingual Science Classroom

Shakhnoza Kayumova, Associate Professor of Science Education at the University of Massachusetts Dartmouth

Akira Harper, PhD Candidate at the University of Massachusetts Dartmouth

Eleanor Richard, PhD Candidate at the University of Massachusetts Dartmouth

Noemi Waight, Associate Professor of Science Education at the University at Buffalo

Impacts of a science teacher's curricular enactment and innovation on students' opportunities for scientific sensemaking

Sage Andersen, University of Texas At Austin

María González-Howard, University of Texas at Austin

Karina D Méndez Pérez, University of Texas At Austin

Instructional Strategies to Manage Scientific Uncertainties for Productive Sensemaking: Exploring Korean and American Classrooms

Heesoo Ha, Center for Educational Research, Seoul National University

Ying-Chih Chen, Arizona State University

Jongchan Park, Arizona State University

Language for scientific sensemaking: Examining a teacher's understandings and instruction for supporting their multilingual students

María González-Howard, University of Texas at Austin

Sage Andersen, University of Texas At Austin

Karina Del Carmen Mendez Perez,

Pre-service Teachers' Motivations to Participate in the Near-Peer Mentoring Program

Ilkem Ozdinc, Bogazici University

Dilara Kara, Bogazici University

Busra Karga, Bogazici University

Gaye Ceyhan, Bogazici University

3/30/22

Strand 4: Science Teaching — Middle and High School (Grades 5-12): Characteristics and Strategies

SC-organized paper set-Socio-scientific issues: Assessment and conceptions in diverse contexts

10:30 AM-12:00 PM

President: Matthew Johnson, Pennsylvania State University

Formative Assessment in Socio-scientific Issues-based Science Lessons: How Teachers do this

Dürdane Dury Bayram-Jacobs, Eindhoven University of Technology

Ineke Henze, Radboud University

Judith Gulikers, Wageningen University & Research

Putting on a 'skeptic hat': Teachers' and students' conceptions of critiquing socioscientific data infographics

Emily Reigh, Stanford

Daniel Pimentel, Stanford University

Bryan A. Brown, Stanford University

Victor Lee, Stanford University

The Intersection of Socioscientific Issues and Classroom Diversity: Affordances and Benefits

Sanlyn Buxner, Planetary Science Institute and the University Of Arizona

Lauren Cabrera, Virginia Commonwealth University

Ananya Matewos, Saint Norbert College

Janelle M. Bailey, Temple University

Using Socioscientific Issues to Promote Middle School Students' Evidence-Based Reasoning and Decision-Making on Hydraulic Fracking

Wardell Anthony Powell, Framingham State University

3/30/22

Strand 5: College Science Teaching and Learning (Grades 13-20)

SC-organized paper set-Student Persistence and Well-Being

10:30 AM-12:00 PM

Presider: Jenny M. Dauer, University Of Nebraska–Lincoln

Analysis of the Interplay between Study Satisfaction, Content Knowledge and Drop-out Intention in Chemistry Studies

Vanessa Fischer, University of Duisburg-Essen

Bianca Schindeldecker, University of Duisburg-Essen

Elke Sumfleth, University Of Duisburg-Essen

Maik Walpuski, University Of Duisburg-Essen

Effect of a Year-long Career-forward Chemistry Laboratory Curriculum on Persistence of Students Majoring in Engineering

Corey A. Payne, University Of Florida

Kent J. Crippen, University of Florida

Going beyond the Content: Impact of a Values Affirmation Writing Exercise on Student Outcomes in an Undergraduate Majors' Biology Course

Emily M. Walter, California State University - Fresno

Micah J. Johnson, California State University - Fresno

Orlando N. Lopez, California State University - Fresno

Glen Martin, California State University - Fresno

Undergraduate Biology Student Perceptions of Wellness Interventions

McKenzie N Jevnikar, NC State University

Colette E Pappas, NC State University

Lisa M Paciulli, NC State University

3/30/22

Strand 5: College Science Teaching and Learning (Grades 13-20)

SC-organized paper set-Students' Learning Science and Engineering Practices

10:30 AM-12:00 PM

President: Angela Google, Middle Tennessee State University

A Model for Facilitating Multidisciplinary Justifications in Engineering Design Challenges

Carina M. Rebello, Purdue University

An investigation of argumentation task framing on students' use of data in introductory biology

Erika Offerdahl, Washington State University

Jessie Arneson, Washington State University

Brett Baerlocher, Idaho State University

Guraustin Brar, Washington State University

Nyck Ledezma, San Louis Obispo

Esperanza Artiles, Central Washington University

Andy Cavagnetto, Washington State University

Drawing-to-Learn in an Undergraduate Herpetology Course: Drawing as a scientific practice to develop Professional Vision

Ashelee Rasmussen, Idaho State University

Charles R. Peterson, Idaho State University

Anna S. Grinath, Idaho State University

When Multimodality Meets Modeling: A Case Study of Preservice Elementary Teachers Building Knowledge in Science (Virtual)

Ayca K. Fackler, University of Georgia

3/30/22

Strand 7: Pre-service Science Teacher Education

SC-organized paper set-On becoming a science teacher

10:30 AM-12:00 PM

President: Claudia Hagan, Georgia State University

"Seriously... I Want to Teach": Exploring Motivations of Science Majors Pursuing Teaching Careers

Austin Heil, University of Georgia

Julie A. Luft, University of Georgia

An Expanded Understanding of the Influence of Antecedent Socialization on the Choice to Become a Science Teacher

Emma J. Refvem, North Carolina State University

M. Gail Jones, North Carolina State University

Sarah J. Carrier, North Carolina State University

Kathryn Rende, North Carolina State University

Julianna Nieuwsma, NC State University

Tammy D. Lee, East Carolina University

Amy R. Taylor, University Of North Carolina At Wilmington

Development of Teacher Identity: From

Saiqa Azam, Memorial University Of Newfoundland

Karen Goodnough, Memorial University Of Newfoundland

3/30/22

Strand 8: In-service Science Teacher Education

SC-organized paper set-Large Scale Investigations Measures of Teacher Learning

10:30 AM-12:00 PM

Presider: Elizabeth B. Lewis, University Of Nebraska–Lincoln

Changes in Teachers' Beliefs and Confidence across Multiple Rounds of Professional Development

Benjamin R. Lowell, Boston College

Katherine L. McNeill, Boston College

Developing Science Teachers Professional Competence in Opened Experimentation – An Intervention Study

Markus Emden, Zurich University of Teacher Education

Arne Bewersdorff, Technical University of Munich

Armin Baur, Heidelberg University of Education

Response Shifts in Measurement of Teacher Growth (Virtual)

Andrea Ash, University of Iowa

Gavin W. Fulmer, University Of Iowa

Strengthening Teachers' Confidence to Mentor Students in STEM Research and Science & Engineering Fair Competitions: PD Models for In-person and Virtual Formats (Virtual)

Julie Angle, Oklahoma State University

Rachel Hartnett, Mount St. Mary's University Emmitsburg, MD

3/30/22

Strand 11: Cultural, Social, and Gender Issues

SC-organized paper set-Structural and Cultural Approaches to Identity and Its Influence

10:30 AM-12:00 PM

President: Phillip A. Boda, University of Illinois At Chicago

A Cultural Impostor? Native American Experiences of the Impostor Phenomenon in STEM (Virtual)

Devasmita Chakraverty, Indian Institute of Management Ahmedabad

Cultural and Racial Barriers for International Students of Color in STEM Graduate Programs

Miguel Rodriguez, University of Utah

Ramon Barthelemy, University of Utah

Understanding the Role of Race and Identity Development in Ethnically Diverse Students at an HBCU

Karen Benn Marshall, Oakwood University

Carmen Bucknor, Oakwood University

Sylvia M. James, National Science Foundation

Christyn Byrd, Oakwood University

Would a career in science suit me? Students' self-view in relation to science and STEM career aspirations (Virtual)

Irene Drymiotou, University of Cyprus & University of Groningen

Costas P. Constantinou, University of Cyprus

Lucy Avraamidou, University Of Groningen

3/30/22

Strand 11: Cultural, Social, and Gender Issues

Related Paper Set-Multi-faceted and Emerging Approaches towards Transforming STEM Teaching, Learning and Research

10:30 AM-12:00 PM

Pedagogical/research methodological approaches for analyzing power shifts in science classrooms

Kathleen Schenkel, San Diego State University

Productive tensions: Researching and imagining a more just STEM education with youth researchers

Colin Hennessy Elliott, Utah State University

Challenging dominant science and language ideologies and practices as a 7th grade dual language teacher

Melissa A. Navarro, San Diego State University

Terrance Burgess, Michigan State University

"Simon says learn." Investigating the narrated and practiced science identities of elementary students of color

Uniting technical approaches and diverse communities: Bringing social justice at the forefront of engineering's design considerations (Virtual)

Sebastian Schäfer, Technical University of Munich

Greses Pérez, Tufts University

Swetha Nittala, Stanford University

Sherri D Sheppard, Stanford University

3/30/22

Strand 12: Technology for Teaching, Learning, and Research

SC-organized paper set-Using Computational Thinking and Videos to Support Pre-Service and In-Service Teachers

10:30 AM-12:00 PM

Presider: Esther Oluwafunmilayo Peter,

Computational Thinking (CT) Integrated STEM Approach: Early Childhood Pre-Service Teachers' CT Skills

Ayse Ciftci, Mus Alparslan University

Mustafa S. Topcu, Yildiz Technical University

Learning Effective Explanation Videos in Physics Lessons

Fabian Gabriel Sterzing, Paderborn University

Christoph Kulgemeyer, Paderborn University

Peter Reinhold, Paderborn University

Leveraging Learning Experience Design to Deploy Embedded Video Questions to Support Students' Online Learning Experience

Joseph T. Wong, University of California, Irvine

Natalie Au Yeung, University of California, Irvine

Brad Hughes, University Of California, Irvine

The Power of Context: Factors that Influence Teachers' Implementation of Unplugged CT-Infused Science Lessons (Virtual)

Vance J. Kite, North Carolina State University

Soonhye Park, North Carolina State University

3/30/22

Strand 14: Environmental Education and Sustainability

Related Paper Set-Towards a Sociopolitical Dispositif Prioritizing Ecological Vitality and Social Justice

10:30 AM-12:00 PM

Among the Possible, the Is and the Ought: Constructs of 'Micro-Sociotechnical Imaginaries'

Majd Zouda, OISE, University of Toronto

Dimitris Tsoubaris , National and Kapodistrian University of Athens

Sarah El Halwany, University of Calgary, Calgary, AB, Canada

Mohammad Nurul-Hassan, OISE, University of Toronto

Minja Milanovic, The Bishop Strachan School, Toronto, ON

Sadia Sahibzada , OISE, University of Toronto

John Lawrence Bencze, University of Toronto

Students' Material-Semiotic Alliances After Power-focused Application-based Learning

John Lawrence Bencze, OISE, University of Toronto

Dave Del Gobbo, Peel District School Board

Sarah El Halwany, University of Calgary, Calgary, AB, Canada

Mohammad Nurul-Hassan, OISE, University of Toronto

Minja Milanovic, The Bishop Strachan School, Toronto, ON

Jasmine Yeung, OISE, University of Toronto

Majd Zouda, University of Toronto

Weaving Art & Science Pedagogies for More Ecologically-vital & Socially-just Dispositifs

Dave Del Gobbo, Peel District School Board, Mississauga, ON, Canada

Sheliza Ibrahim Khan, University of Toronto

Sarah El Halwany, University of Calgary, Calgary, AB, Canada

Majd Zouda, University of Toronto

Minja Milanovic, The Bishop Strachan School, Toronto, ON

Mohammad Nurul-Hassan, OISE, University of Toronto

Mirjan Krstovic, Peel District School Board, Mississauga, ON, Canada

John Lawrence Bencze, OISE, University of Toronto

Teaching with Emotions: Supporting Critical Views on Nature of Science

Sarah El Halwany, University of Calgary, Calgary, AB, Canada

Mohammad Nurul-Hassan, OISE, University of Toronto

Dave Del Gobbo, Peel District School Board, Mississauga, ON, Canada

Sheliza Ibrahim Khan, University of Toronto

Jasmine Yeung, OISE, University of Toronto

Majd Zouda, OISE, University of Toronto

John Lawrence Bencze, OISE, University of Toronto

Applying an Action-Oriented Pedagogy and STEM Teacher Identity: An Autoethnography

Mohammad Nurul-Hassan, OISE, University of Toronto

Sarah El Halwany, University of Calgary, Calgary, AB, Canada
Majd Zouda, University of Toronto
Kristen Schaffer, OISE, University of Toronto
John Lawrence Bencze, University of Toronto

3/30/22

Research Committee

Admin Symposium-Future Directions for Research on Equitable and Socially Just Assessments in Science and Engineering Education

10:30 AM-12:00 PM

Future Directions for Research on Equitable and Socially Just Assessments in Science and Engineering Education

Asli Sezen-Barrie, University of Maine

Malcolm B. Butler, University of Central Florida

Rouhollah Aghasaleh, Humboldt State University

Sarah J. Fick, Washington State University

Marcus Kubsch, IPN - Leibniz Institute for Science and Mathematics Education

Li Ke, University of North Carolina at Chapel Hill

Yann Shiou Ong, Nanyang Technological University

3/30/22

Multi-Strand

Virtual Session C

10:30 AM-12:00 PM

Epistemic Empathy: A Resource for Responsive Teaching (Virtual)

Lama Z. Jaber, Florida State University

Shannon G. Davidson, Florida State University

Allison Metcalf, Florida State University

From Practical to Metacognitive Strategy: Meta-epistemic Discourse and Crosscutting Concept Supports in Curriculum (Virtual)

Lori Andersen, University of Hawai'i at Mānoa

Evaluating the Impact of Online Activities Designed to Help High School Students Reason like Chemists (Virtual)

Sierra McCormick, WestEd

Jodi Davenport, WestEd

Anna Rafferty, Carleton College

Jacklyn Powers, WestEd

Sandra Raysor, Carnegie Mellon University

David Yaron, Carnegie Mellon University

Modeling-based Learning in Pre-School Science: Affordances of Different Types of Student-Constructed Models (Virtual)

Loucas T. Louca, European University-Cyprus

3/30/22

Strand 1: Science Learning: Development of student understanding

SC-organized paper set-Modelling in Science Learning

1:30 PM-3:00 PM

President: Marcus Kubsch, IPN - Leibniz Institute for Science and Mathematics Education

Building a Computational Model of Food Webs: Impacts on Computational and Systems Thinking Skills

Arif Rachmatullah, SRI International

Eric N. Wiebe, North Carolina State University

Mathematical Modelling in Physics Education

Lilach Ayali, Technion - Israel Institute of Technology

Shulamit Kapon, Technion - Israel Institute of Technology

Scaffolding Sociopolitical Dimensions of Climate Change in Diagrammatic Models

Heather F. Clark, UCLA

Darlene Tieu, LAUSD

Leticia Perez, UCLA

Jaleel Howard, UCLA

Students' Conceptual Models in the Context of Air-Quality Learning Unit

Shirly Avargil, Technion - Israel Institute of Technology

Arunika Saxena, Technion Israel Institute of Technology

François G. Amar, University of Maine

Mitchell Bruce, University Of Maine

3/30/22

Strand 2: Science Learning: Contexts, Characteristics and Interactions

SC-organized paper set-High school Science Teaching & Learning

1:30 PM-3:00 PM

President: Lexie Zhao,,

Exploring the Efficacy of CTCA in Breaking Barriers to Students' Learning of Difficult Concepts in Biology

Imole J. Samson, Lagos State University
Peter A. Okebukola, ACEITSE-Lagos State University
Esther O. Peter, ACEITSE-Lagos State University
David G. Peter, Lagos State University
Deborah Oluwatosin Agbanimu, ACEITSE-Lagos State University
Fred Awaah, University of Professional Studies Accra
Franklin U. Onowugbeda,
Adekunle I. Oladejo,

Investigating students' context choice in chemistry education

Fabien Güth, University of Duisburg-Essen
Helena Van Vorst, University of Duisburg-Essen

Students' Types of Interest in Physics

Sarah Maria Zochling,
Julia Woithe, CERN
Sascha M. Schmeling, CERN
Martin Hopf, University of Vienna

Studying girls' achievement outperformance in Oman: An exploration of attitudinal perceptions towards Science and learning

Sulaiman M. Al-Balushi, Sultan Qaboos University
Rashid S Almehrizi, Sultan Qaboos University
Ibrahim S. Al-Harthy, Sultan Qaboos University
Ambusaidi K. Abdullah, Sultan Qaboos University
Khadijah Al-Balushi, Ministry of Education
Moza Al-Balushi, Ministry of Education
Mohammed Al-Aghbari, Sultan Qaboos University

Using Science Historical Short Stories to Impact Students' Science-specific and General Epistemological Beliefs (Virtual)

Jaelyn M. Easter, Grand View University
Jerrid W. Kruse, Drake University
Jesse L. Wilcox, University of Northern Iowa

3/30/22

Strand 3: Science Teaching — Primary School (Grades preK-6): Characteristics and Strategies

Related Paper Set-Project-based Learning Contexts for Developing Adaptation Design Principles that Promote Engagement and Equity

1:30 PM-3:00 PM

Discussant: Samuel Severance, University of California, Santa Cruz

Presider: Joseph S. Krajcik, Michigan State University

Using Adaptation Design Principles to Support Teacher Agency in Professional Learning

Emily C. Adah Miller, University of Wisconsin Madison

Susan K. Codere, MSU

PBL Adaptation Principles to Support Equitable Science Instruction

Selin Akgun, Create4STEM

Maria Simani, University of California at Riverside

Hilda Makori, Create for STEM at Michigan State University

Employing adaptation design principles to enhance elementary student engagement in modeling

Tingting Li, CREATE for STEM Institute

How can culturally responsive teaching be framed as creative endeavor through adaptation design principles? (Virtual)

Maria C. Simani, University Of California, Riverside

Kathryn Bateman, Create for STEM at Michigan State University

Emily C Miller, University of Wisconsin-Madison

3/30/22

Strand 4: Science Teaching — Middle and High School (Grades 5-12): Characteristics and Strategies

SC-organized paper set-STEM integration in secondary science classrooms

1:30 PM-3:00 PM

Presider: Brandon Rodriguez, NASA Jet Propulsion Lab

How do excellent STEM teachers design and implement best practice of inquiry-based learning? (Virtual)

Shani Zur, Technion Institute

Tali Tal, Technion

Middle School Teachers and Undergraduate Mentors Collaborating for Culturally Relevant STEM Education

Meredith W. Kier, College of William and Mary

The impact of technical Science in increasing access to Stem education for vocational careers in South Africa

Emmanuel Mushayikwa, University of the Witwatersrand

Magdeline Mmapaseka Stephen, University of Witwatersrand

Using event mapping to investigate secondary master teachers' enactment of Naval STEM tasks

Jeffrey D. Radloff, SUNY Cortland

Dominick Fantacone, SUNY Cortland

Angela Pagano, SUNY Administration

3/30/22

Strand 5: College Science Teaching and Learning (Grades 13-20)

SC-organized paper set-Student Success and 21st Century Skills

1:30 PM-3:00 PM

President: James M. Nyachwaya, North Dakota State University

Addressing Pre-service Teachers' Misconceptions and Promoting Conceptual Understanding through the Conceptual Change Model.

Johannes Addido, University of Wyoming

Evaluating Evidence-Based Practices Influencing Graduation and Participation in the STEM Workforce and Graduate Programs

Natalie L Hyslop, University of North Georgia

John Holliday, University of North Georgia

Linda B Purvis, University of North Georgia

April A Nelms, University of North Georgia

John D Leyba, University of North Georgia

Michael Bodri, University of North Georgia

Improving Self-Reported Measures of 21st Century Skills in an Interdisciplinary Undergraduate STEM Course

Haider Ali Bhatti, Graduate Group in Science and Mathematics Education (SESAME)
University of California, Berkeley

Perman Gochyyev, Graduate School of Education University of California, Berkeley

Mark Wilson, Graduate School of Education University of California, Berkeley

Robert J Full, Department of Integrative Biology University of California, Berkeley

Investigating Student Response to Anomalous Data When Analyzing and Interpreting Data

Adrian L Adams, University of Utah, Department of Educational Psychology

Lauren A Barth-Cohen, University Of Utah, Department of Educational Psychology

Jason M May, University of Utah, Department of Physics and Astronomy

3/30/22

Strand 5: College Science Teaching and Learning (Grades 13-20)

SC-organized paper set-Undergraduate and Graduate Student Perspectives on Teaching and Learning

1:30 PM-3:00 PM

President: Mary M. Atwater, University Of Georgia

Analysis of graduate teaching assistant discourse behaviors and the effects of a professional development intervention

Abdirizak M. Warfa, University of Minnesota

Marin Melloy, University of Minnesota

Biology Teaching Assistants Engagement with Educative Curriculum Materials and Enactment of Rigorous Classroom Discourse

Alyssa Freeman, Idaho State University

Angela Google, Middle Tennessee State University

Zhigang Jia, Middle Tennessee State University

Tina B Carter, Middle Tennessee State University

Anna S. Grinath, Idaho State University

How Physical Science Doctoral Students Involved in Educational Outreach View and Value their Educator Role

Anne M McAlister, University of Virginia

Sarah Lilly, University of Virginia

Jennifer Chiu, University Of Virginia

Relating TAs' Enacted Instruction to their Beliefs about Teaching and Learning in an Introductory Physics Tutorial using CHAT (Virtual)

May Lee, University of Groningen

Michael Bennett, University of Colorado - Boulder

3/30/22

Strand 7: Pre-service Science Teacher Education

SC-organized paper set-Building preservice teacher self-efficacy and competence in STEM Education

1:30 PM-3:00 PM

President: Hadeel Omar Edrees Dabbah, Ben-Gurion University of the Negev

An Investigation of Pre-Service Teachers' Self-Efficacy Perceptions for STEM Integration (Virtual)

Hamdican Yildirim, Hacettepe University

Sevinc Gelmez Burakgazi, Hacettepe University

Integrating Computational Thinking (CT) in STEM Education: Early Childhood Pre-Service Teachers' CT Teaching Self-Efficacy Beliefs

Mustafa S. Topcu, Yildiz Technical University

Ayse Ciftci, Mus Alparslan University

PRE-SERVICE TEACHERS' LEARNING TO INFUSE ENGINEERING INDICATORS INTO STEM LESSON PLANS

Sevgi Aydin, Van Yuzuncu Yil University

Betul Ekiz Kiran, Tokat Gaziosmanpasa University

Elif Selcan Oztay, Van Yuzuncu Yil University

3/30/22

Strand 7: Pre-service Science Teacher Education

SC-organized paper set-Using technology and modeling in science teacher education

1:30 PM-3:00 PM

Presenter: Xinying Yin, California State University-San Bernardino

Fostering TPACK in Science Teacher Education – Re-Design and Evaluation of a University Course

Lisa Stinken-Rösner, Leuphana University Lüneburg

Knowledge, Practice and Product: Developing Preservice Science Teachers' Modelling Competence

Song Xue, School of Education and Social Work, University of Dundee

Keith Topping, School of Education and Social Work, University of Dundee

Elizabeth Lakin, School of Education and Social Work, University of Dundee

Science Teaching Orientations of Pre-Service Teachers in a Transformative Learning Environment

Duygu Yilmaz Ergul , Gazi University

Mehmet F. Tasar, Gazi University

That's Enough For An Explanation: Pre-Service Teachers Linking Epistemic And Pedagogical Decisions When Developing Models

Maria E. Tellez-Acosta, PhD Student Martin-Luther-Universität Halle-Wittenberg

Scott McDonald, Professor of Science Education. Pennsylvania State University

Andres Acher, Primary Science Education. Fakultät für Biologie, Universität Bielefeld

3/30/22

Strand 8: In-service Science Teacher Education

Symposium-Supporting Teacher Leadership Development: Roles, Growth and Research

1:30 PM-3:00 PM

President: Arthur Eisenkraft, University Of Massachusetts Boston

Supporting Teacher Leadership Development: Roles, Growth and Research

Emily J. Perry, Sheffield Hallam University

Arthur Eisenkraft, University Of Massachusetts Boston

Amanda M. Gunning, Mercy College

Meghan E. Marrero, Mercy College

Tammy Wu Moriarty, Stanford University, Graduate School of Education

Janet Carlson, Stanford University

Stuart C. Bevins, Sheffield Hallam University

Richard Pountney, Sheffield Hallam University

Josephine Booth, Sheffield Hallam University

Joelle Halliday, Sheffield Hallam University

3/30/22

Strand 11: Cultural, Social, and Gender Issues

SC-organized paper set-Student Engagement Across Intersecting Identities

1:30 PM-3:00 PM

President: Jaimie Lauren Miller-Friedmann, University of Birmingham

Ways of Identifying as Other: a longitudinal case study of women of colour in physics

Nicola Wilkin, University of Birmingham

Jaimie Lauren Miller-Friedmann, University of Birmingham

Judith Hillier, University of Oxford

Intersectional Analysis of Advanced Placement Chemistry Enrollment and Performance

Robert Krakehl, Stony Brook University

Martin Francis Palermo, Stony Brook University

Angela M. Kelly, Stony Brook University

Enhancing Performance of Students with Intersectional Identities in Inclusive Science

Classrooms via Multimedia Professional Development

Lindsay M. Carlisle, University of Virginia

Victoria VanUitert, University of Virginia

Michael J. Kennedy, University of Virginia

Examining Exclusionary and Inclusionary College Classroom Experiences: Effects on Women in

Engineering Majors by Race/Ethnicity

Tatiane Russo-Tait, University of Texas at Austin

Catherine Riegler-Crumb, University of Texas at Austin

Ursula Nguyen, University of Texas at Austin

Katherine Doerr, The University of Texas at Austin

3/30/22

Strand 11: Cultural, Social, and Gender Issues

SC-organized paper set-Approaches to Equitable Science Teaching in K-12 Classrooms

1:30 PM-3:00 PM

President: Kathleen Schenkel, University of Michigan

Connecting Justice-Centered pedagogy to Students' Critical Science Agency in an Elementary and Middle School Science Classroom

Selene Y. Willis, University Of South Florida

Dana L. Zeidler, University Of South Florida

Enhancing STEM Teacher Candidates' Understanding and Implementation of Equity, Diversity, and Inclusion Through Differentiated Instruction

Mohammed Estaiteyeh, Western University

Isha DeCoito, Western University

The Importance of Epistemic Empathy for Equitable and Rigorous Science Teaching

Allison T Metcalf, Florida State University

Shannon G. Davidson, Florida State University

Lama Jaber, Florida State University

3/30/22

Strand 12: Technology for Teaching, Learning, and Research

SC-organized paper set-Using digital technologies, simulated teaching, and assessment to support teaching and learning

1:30 PM-3:00 PM

Presider: Vance J. Kite, North Carolina State University

TPACK in teacher education - Supporting pre-service teachers' reflections and use of digital technologies in science teaching

Pernilla Nilsson, Halmstad University

Using Simulated Classrooms to Examine How Formative Feedback Impacts Elementary Teachers' Ability to Facilitate Discussions

Jamie N. Mikeska, Educational Testing Service (ETS)

Jonathan Steinberg, ETS

Pamela S. Lottero-Perdue, Towson University

Dante Cisterna, Educational Testing Service

Analysis of Concept Maps for the use in Formative Assessment: Can Machine Learning help?

Tom Bleckmann, Leibniz Universitaet Hannover, Institute for Mathematics and Physics Education

Gunnar Friege, Leibniz Universitaet Hannover, Institute for Mathematics and Physics Education

Wolfgang Gritz, TIB Hannover

Ralph Ewerth, TIB Hannover

Digital Curation as a Pedagogical Approach Promoting Critical Thinking (Virtual)

Rivka Gadot, Technion - Israel Institute Of Technology Jerusalem College of Technology The Open University of Israel

Dina Tsybulsky, Technion - Israel Institute Of Technology

3/30/22

Strand 14: Environmental Education and Sustainability

SC-organized paper set-Building competencies for tackling real world problems

1:30 PM-3:00 PM

Presider: Imogen Herrick, University of Southern California

Infusing social responsibility in higher education through education for sustainable development (Virtual)

Heba El-Deghaidy, The American University In Cairo

Theorizing Science-Civic Practices: Youth Adaptation and Remixing of Science Practices within Digital Civic Participation

Lynne Zummo, University of Utah

Emma C Gargroetzi, University of Texas at Austin

The Effectiveness of Education for Sustainable Development in Promoting Students' Action Competence for Sustainability

Daniel Olsson, Environmental and Life Sciences, Karlstad university

Niklas M. Gericke, Department of Environmental and Life Sciences

A Curricular Model to Train Doctoral Students in Interdisciplinary Collaborative Research at the Food-Energy-Water Nexus (Virtual)

Rianna T. Murray, University of Maryland, College Park

Kelsey McKee, University of Maryland, College Park

Amy R Sapkota, University of Maryland, College Park

Stephanie Lansing, University of Maryland, College Park

Gili Marbach-Ad, University Of Maryland, College Park

3/30/22

Admin Symposium-Indigenous science knowledge as social and cultural capital supporting more resilient and sustainable communities

1:30 PM-3:00 PM

Indigenous science knowledge as social and cultural capital supporting more resilient and sustainable communities

Pauline W. U. Chinn, University of Hawaii at Manoa

Bhaskar Upadhyay, University of Minnesota

David Zandvliet, Simon Fraser

Gayle A. Buck, Indiana University

Julie R. Robinson, University of North Dakota

Rouhollah Aghasaleh, Humboldt State University

Kamal P. Koirala, Tribhuvan University